SOVIET TANKS AT STALINGRAD 1942–43

WILLIAM E. HIESTAND

ILLUSTRATED BY STEVE NOON

NEW VANGUARD 345

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SOVIET TANKS AT STALINGRAD 1942–43

INTRODUCTION

After suffering the loss of thousands of tanks and millions of troops during the summer of 1941, Soviet forces halted the Wehrmacht's last desperate attempt to capture Moscow in early December. In 1942, Hitler would aim his main offensive against Soviet oil fields in the south in a campaign that would climax at the city of Stalingrad. The Red Army met the Panzer divisions with a reborn armored force growing in numbers and capability. More T-34s were joining the order of battle and, along with large numbers of light and lend-lease tanks, formed new tank corps and tank armies. The Red Army's hasty training programs, poor tactics, and inexperienced leaders and staffs led to a new series of costly defeats, but in the last months of 1942, Soviet tank forces led offensives that would cost Hitler his 1942 gains and turn the tide on the Eastern Front.

DOCTRINE AND ORGANIZATION

The USSR had the largest tank force in the world in June 1941, but Hitler's Operation *Barbarossa* caught the Red Army in the midst of modernizing and reorganizing its mechanized forces. The Soviets were in the process of forming 29 new mechanized corps, each with one motorized and two tank divisions, with an intended full strength of 1,031 tanks and 36,000 men. When the war began, the new corps lacked training and, as new production T-34 medium and KV-1 heavy tanks were just beginning to join the force, were largely equipped with worn-out and obsolete BT series and T-26 tanks. Most of the partially formed mechanized corps were destroyed in the first weeks of the German offensive, and the surviving formations were soon disbanded. The bulk of the USSR's prewar arsenal of over 20,000 tanks had been lost by the time the Wehrmacht launched its autumn Operation *Typhoon* lunge against Moscow. In turn, losses and breakdowns had reduced the

Destroyed Red Army BT tanks, 1941. The bulk of the more than 20,000-strong Soviet tank inventory in June 1941 consisted of obsolete and worn-out T-26 infantry and BT fast tanks. Most were destroyed in the first months of the war, although small numbers served on in 1942 and some stationed in the Far East participated in the 1945 offensive against Japanese forces in Manchuria. (Nik Cornish at www.Stavka.photos)

Panzer divisions to handfuls of tanks and a battalion or two of motorized infantry each. The Wehrmacht's attack stalled in December in the harsh winter weather just short of the Soviet capital.

A KV-1 tank unit listens to a speech before battle during November 1942. By late 1942, KV-1 heavy tanks were generally no longer integrated into tank brigades but organized into 21-strong separate tank regiments for infantry support. The Communist regime considered political indoctrination and propaganda an essential element of military training. (Photo by Popperfoto via Getty Images)

After the leading German units were driven back from their positions near Moscow, Stalin ordered the Red Army to launch an ambitious front-wide offensive aimed at smashing the Wehrmacht during the winter months and driving it completely out of Soviet territory. During the summer, the Soviets had successfully evacuated their military industry to the Urals before it could be overrun, but the factories were just restarting production and the number of tanks leaving the plants was at its lowest point of the war. At the start of 1942, only about 3,300 Soviet tanks had survived to support the winter offensive, while another few thousand were guarding the Far East, the Turkish border, or in other interior military districts.

The Tank Brigade. As Stalin's counterattack began in January, Soviet tanks were organized in 76 understrength tank brigades and 100 battalions dispersed up and down the line. The brigades were small, roughly the equivalent of western tank battalions, and equipped with mixes of heavy, medium, and light tanks along with a motorized rifle battalion that rode the tanks into battle. The formal December tank brigade organization had a strength of ten KV-1 heavy, 22 T-34 medium, and 20 T-60 light tanks, although the brigades were rarely at full strength, and many were equipped with surviving prewar BTs or T-26s. To penetrate German defenses during Stalin's winter offensive, Red Army commanders formed mobile shock groups centered around a tank brigade, rifle division, and any available cavalry and ski units. The shock groups lacked artillery and logistical support assets, and while often able to drive deep between the German fortified hedgehogs, were generally unable to take them.

Evolution of the Soviet tank brigade, 1941–43

Date	**August 1941**	**December 1941**	**July 1942**	**November 1943**
KV-1s	7	10	0	0
T-34s	22	16	32	65
T-60s or T-70s	64	20	21	0
Total tanks	93	46	53	65
Motorized rifle battalions	1	1	1	1
Antitank guns/mortars*	8/6	8/6	4/6	4/6
Manning	1,943	1,471	1,038	1,354

*45mm antitank guns/82mm mortars

In early 1942, increases in tank production allowed the Soviets to begin rebuilding the force, and by July the Red Army fielded 125 tank brigades. To make the brigades more capable of independent operations, the Soviets strengthened their organic supply, maintenance, medical, and antiaircraft capabilities. Problems operating the slower KV-1s with the T-34s soon led to the heavy tanks being removed from the brigades and formed into heavy tank brigades or special breakthrough tank regiments. As they were attached to infantry units for direct support operations, the tank regiments had 21 KV-1s but no organic motorized rifle battalion. The Red Army also fielded independent tank battalions (OTBs) intended for direct support of the infantry and equipped with 21–31 tanks, typically with mixes of obsolete BTs and T-26s and sometimes lend-lease tanks. Flamethrower OTBs had 21 OT-34 or KV-8 flamethrower versions of the T-34 and KV-1. Over the course of the war, the number of OTBs declined as additional separate tank regiments became available to fulfill the infantry support role.

The Tank Corps. With the failure of the winter offensive, the Soviet leadership realized that small tank brigades lacked adequate combat power for the mechanized deep battle exploitation operations envisaged in Red Army doctrine. As a result, Stavka authorized the formation of 25 new tank corps in February 1942. Each would consist of two tank brigades – soon increased to three – along with a motorized rifle brigade, giving a table of organization strength of 100 or more tanks. In western terms, they were division-sized formations, although lacking the robust support units and indirect-fire and communication capabilities of German Panzer divisions. Four tank corps were formed in March, followed by ten more in April and six in May. Several battle-tested tank brigade commanders, including Mikhail Katukov and Pavel Rotmistrov, were put in command of the first new corps formed.

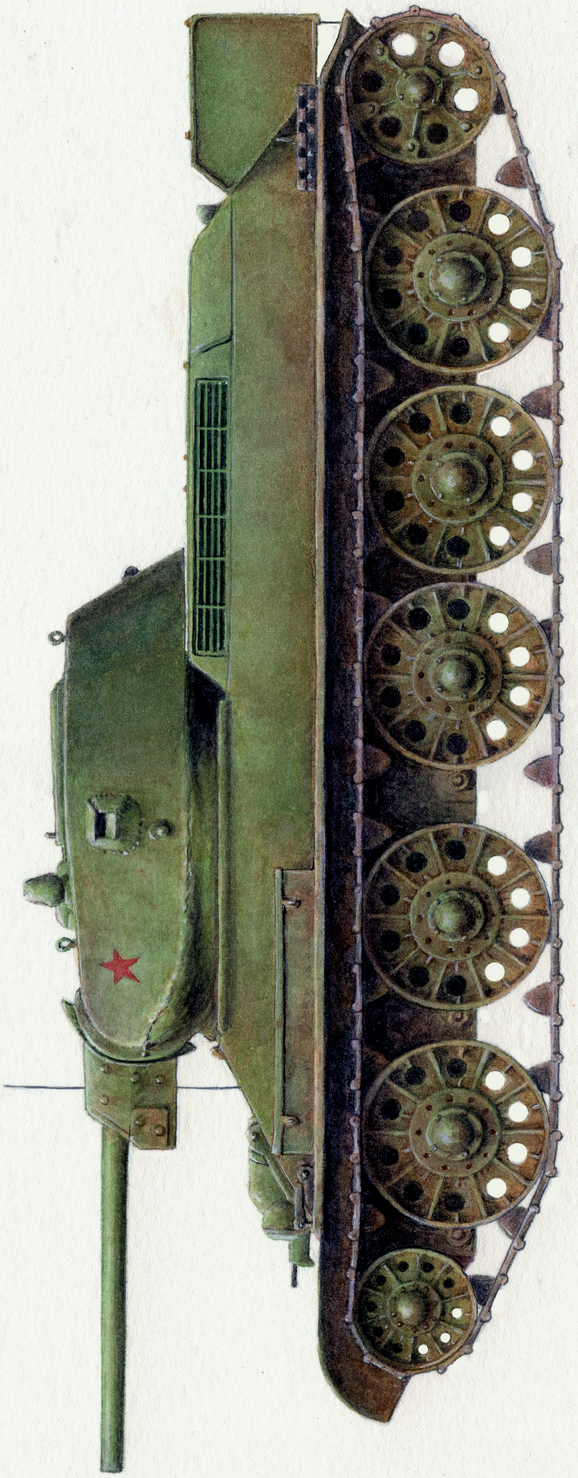
The initial tank corps organization lacked artillery, reconnaissance, engineer, and logistical support units. Trucks were in short supply in the USSR in 1942, with thousands lost the year before, and although truck factories had been evacuated to the Urals, they were shifted to light tank production. As a result, most of the infantry in the tank corps were transported on the tanks, including into combat. In action, these tank *desant* troops provided immediate infantry support but were extremely vulnerable to enemy machine-gun, mortar, and artillery fire. Similarly, there were few trucks available to tow artillery, and the Red Army's most capable long-range guns and howitzers were centralized in General Staff-controlled artillery brigades that

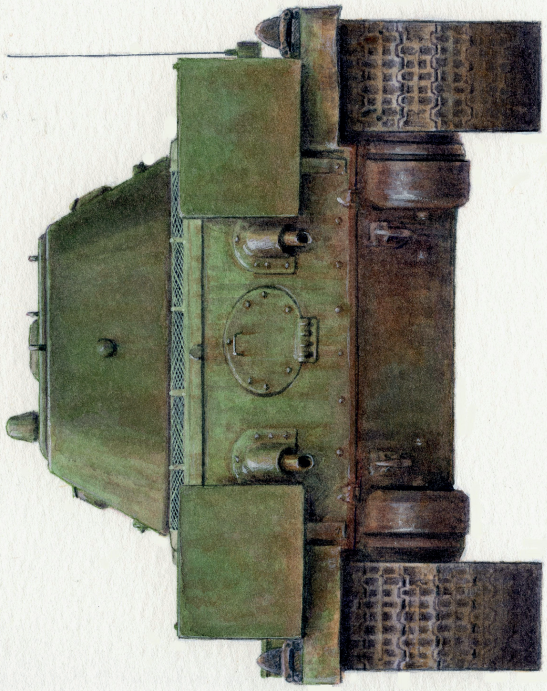
T-60 light tanks operating alongside Soviet artillery. The new Soviet tank corps organized in 1942 had no organic indirect-fire support units. A battalion of truck-mounted Katyusha multiple rocket launchers was soon added, as they were mobile enough to keep up with the tanks, and could deliver rapid, concentrated firepower to support offensive operations. Despite continued improvements throughout the war, the tank corps never approached the Panzer divisions' capability to flexibly support offensive or defensive operations with multiple indirect-fire artillery battalions. (Nik Cornish at www.Stavka.photos)

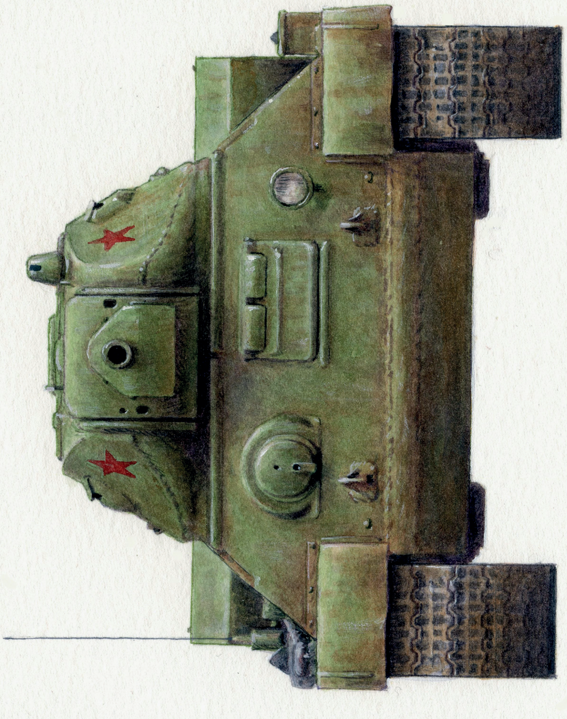
A

T-34, 6th TANK BRIGADE, AUGUST 1942

The T-34 medium tank was the key offensive component of the Red Army's reborn armored force in 1942. The T-34 portrayed was produced by the Stalingrad Tractor Factory (STZ) and fielded with the 6th Tank Brigade formed near the city in December 1941. The tank is painted in the standard 4BO green paint used on Red Army vehicles during World War II. Unlike most Soviet Great Patriotic War tanks, the 6th Tank Brigade had red stars on its turrets as shown here. Fighting with the Stalingrad Front, the 6th took such heavy losses, it was disbanded in October and the remnants used to reinforce other units. The Stalingrad STZ plant continued to produce T-34s as the *Blau* offensive neared the city in late 1942, with the last completed sent into combat as the German Sixth Army attacked the factory complex itself.







A Soviet unit on the move with T-70s towing sleds with winter-camouflaged ski troops. Ski units were used during the 1941–42 winter counteroffensive, although most units were not as well equipped as these. To break through German winter hedgehog defenses, the Red Army made extensive use of ad hoc groupings of tanks, cavalry, partisans, and some airborne troops, but the units lacked the needed firepower and logistical support to destroy enemy positions. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

could be allocated to fronts, infantry armies, or armored formations for specific missions.

As the Red Army's new specialized units for exploitation, the tank corps would logically have been fully equipped with the fast, reliable, and powerful T-34. Tank losses remained high, however, and a large portion of new production was made up of the light T-60s, soon joined by the T-70. In addition, Soviet infantry army commanders demanded their own separate tank brigades and regiments, and a portion of new-production T-34s and KV-1s were allocated to these formations. As a result, several tank corps were fully or partially equipped with lend-lease tanks, and T-60s and T-70s made up about 40 percent of the tank corps table of organization throughout 1942. The tank corps only became fully equipped with T-34s in late 1943.

The new tank corps were first sent into action during the Soviet May 1942 Kharkov offensive, but the two committed failed to provide the intended boost for the attack. One tank corps was ultimately encircled and destroyed, and the other badly damaged. The next few months saw a series of unsuccessful counterattacks by multiple tank corps against the German summer *Fall Blau* offensive as it advanced towards Voronezh and then Stalingrad. It soon became clear that the tank corps lacked the artillery, communications, and combined-arms capabilities to match the offensive power of Panzer divisions. The corps lost their tank strength rapidly in combat and, even after successful advances, lacked the staying power to secure ground taken in the face of German counterattacks. Steps were taken to strengthen the tank corps' organization, with a fuel supply company added to the organization in June, and a Guards Mortar Battalion equipped with Katyusha multiple rocket launchers and reconnaissance battalions added in July.

Evolution of the tank corps, and initial organization of the mechanized corps, 1942

Date	March 1942	April 1942	September 1942	December 1942
Formation type	Tank corps	Tank corps	Mechanized corps	Tank corps
KV-1	20	30–65	0	0
T-34	40	46–56	100	107
T-60/70	40	60	75	63
Total tanks	100	146–180	175	170
Total guns*	78	80	226	76
Total personnel	5,603	7,200–7,600	13,599	7,853

*45mm antitank guns, 82 and 120mm mortars, and 76mm guns

The Mechanized Corps. Given the tank corps' lack of staying power, the Soviet *Stavka* high command soon created a new mechanized corps formation to be better able to exploit breakthroughs and hold the ground gained. The first mechanized corps were formed in September 1942, built around three mechanized brigades, each with three infantry battalions and a 39-tank regiment. The 1942 mechanized corps had two armored regiments or two armored brigades in addition to the three mechanized brigades, giving the organization more infantry and tanks than the tank corps. Although a much more powerful combined arms force, the Red Army only formed eight mechanized corps in 1942 due to the large amounts of scarce specialized personnel and equipment they required. Forty-six percent of the mechanized corps manning consisted of officers, NCOs, or enlisted specialists, and the organization required an unusually high amount of scarce transportation and communications equipment.

The 1942 Tank Army. Soon after the Kharkov defeat, the Red Army began to organize tank armies to improve the operations of its growing numbers of tank corps. These armies were intended to be assigned to fronts to conduct exploitation operations along the lines of the Soviet military's 1930s deep battle doctrine. Unlike the later standardized tank armies of 1943–45, however, the first tank armies were ad hoc formations built on existing infantry field army

The T-34 medium tank was the key component of the reviving Soviet armored force in 1942, but heavy losses forced the Red Army to use less-capable T-60 and T-70 light and lend-lease tanks received from the Western allies to fill out its new tank brigades and corps. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka) headquarters staffs with no set organization. They typically controlled two tank corps, one or more rifle divisions, and a variable mix of supporting units. The 1942 tank armies suffered from inexperienced leaders and staffs, as well as shortages in radio and communications equipment, and it proved difficult to coordinate the actions of tanks, foot infantry, and sometimes cavalry units. Unlike German Panzer units, the tank armies had little organic indirect-fire artillery, and in 1942 could only usually rely on one regiment of truck-mounted Katyusha multiple rocket launchers.

The 1942 tank armies

Tank army	Formed	Tank corps	Rifle divisions	Other major units	Notes
3rd	May	12, 15	154, 264	197 Tank Brigade	Reinforced by 3rd Tank Corps, unsuccessful offensive against AG Center, August 1942
5th	July 6–12	2, 7, 11	340	19 Tank Brigade	Organization during failed Voronezh counterattack
1st	July	12, 28	131, 399	158 Tank Brigade	Heavy losses late July; disbanded September
4th	July	22, 23	18	131 Tank Brigade	Heavy losses late July; disbanded October
5th	November	1, 26	14G, 47G, 50G, 119, 159, 346	8 Cavalry Corps and 8G Tank Brigade	Organization for Operation *Uranus*

G = Guards

TECHNICAL FACTORS

T-34 (76mm)

The T-34 emerged from Soviet efforts to upgrade its tank force based on lessons from the Spanish Civil War. There, the thinly armored BT series of fast tanks and the T-26 infantry tank had been vulnerable to the German-designed 3.7cm antitank gun, and designer Mikhail Koshkin was assigned to upgrade the BT with a diesel engine and thicker armor. Koshkin produced the A-20, an improved BT-7, but gained Stalin's approval to pursue a dramatically improved universal tank that could fulfill the roles played by the BT fast, T-26 infantry, and T-28 medium tanks. The result was initially designated the A-30 and T-32, and ultimately accepted into service as the T-34.

Koshkin had designed a tank with a superb balance of mobility, protection, and firepower. In place of the gasoline engines used in previous Soviet tanks, the T-34 had a powerful and reliable water-cooled V-2 diesel engine, and its Christie suspension and wide tracks gave exceptional off-road mobility in the snow and mud typical of the Eastern Front. Koshkin sloped the T-34's armor, improving the chances of enemy shells ricochetting off and increasing the horizonal line-of-sight thickness without adding weight. The T-34 could reach over 50km per hour on the road and its internal fuel supply gave it a range of over 300km. The initial 76.2mm L-11 main gun was soon replaced by the longer F-34 76.2mm, allowing the T-34 to penetrate the armor of any German tank, along with the ability to fire an excellent HE (High Explosive) shell against soft targets such

Soviet infantry in winter camouflage mounting a T-34. The shortage of trucks forced Red Army tank and mechanized formations to transport most of their infantry on the decks of their tanks, which entered battle carrying their supporting infantry. The troops provided immediate close support to the attacking tanks, although they were extremely vulnerable to enemy artillery, mortar, or small arms fire when entering the battle zone. (From the fonds of the RGAKFD in Krasnogorsk via Stavka) as enemy trucks, infantry, or fortifications. T-34s carried 77 and later 100 mixes of armored piercing and HE main gun rounds. 7.62mm DT machine guns mounted in the hull and coaxially provided the secondary armament.

The T-34 was superior to the Wehrmacht's Panzerkampfwagen (PzKpfw) IIIs and IVs, its most capable opponents, on all counts. The German tanks had less powerful engines, and narrow tracks with inferior mobility in muddy, icy, or snowy conditions. The T-34's sloped armor and 76.2mm gun was superior to the Panzers' armor and shorter 5.0cm and 7.5cm main armament. The Soviet tank could destroy its opponents at typical engagement ranges, while the Germans would need to aim for the T-34's turret ring in hopes of jamming it or try to close to short range and engage the T-34 from the sides or rear. Despite its superior characteristics, however, the T-34 suffered from its two-man turret crew, which left the tank commander responsible for aiming and firing the main gun in addition to directing the driver and scanning the battlefield for targets. The commander's job was made harder by poor visibility, with his periscope-telescopic sight giving only a limited field of view. The T-34's forward-opening turret hatches made it difficult for Soviet tank commanders to operate in battle with their heads out of the hatch for better situational awareness, the preferred mode of the Panzer commanders. Most Soviet tanks lacked radios before 1943, placing the additional burden on T-34 platoon and company commanders of trying to control their units with flags, flares, and tracers.

The Wehrmacht began to take measures in 1942 to help redress the firepower and armor advantages of the T-34 and KV-1. Germany had been experimenting with HEAT (High Explosive Antitank) ammunition since 1939, and after accelerating the program 7.5cm HEAT rounds began to reach German units in January 1942. As the HEAT destructive effect relies on the detonation rather than kinetic energy, these rounds could be effective out to 1,000m. Tungsten-core rounds were also developed for the 5.0cm Pak 38 antitank gun and the 5.0cm carried by the Panzer III, again giving

A T-34 demonstrating its speed and mobility. The T-34 was the heart of the Red Army's tank force in 1942, and its armor and firepower gave it a technological edge over its German opponents, although the Wehrmacht began to improve its capabilities against it during the year. By 1943, German forces had developed better antitank guns and armament for its PzKpfw IVs, and fielded the new Panther and Tiger tanks, but the 76mm T-34 and the up-gunned T-34/85 remained the primary Soviet tank throughout the war. (From the fonds of the RGAKFD in Krasnogorsk via Stavka) a capability against the armor of the T-34 and KV-1, although Germany's limited ability to acquire tungsten led these rounds to fall out of service in 1943. The Wehrmacht particularly focused on fielding longer guns on its tanks to improve anti-armor performance, with PzKpfw IIIs up-gunned with a longer KwK 39 L/60 joining the force in December 1941. The new gun allowed the tank to have an improved capability against the T-34 at 500m or less, although its inferior armor still put it at a disadvantage at all typical engagement ranges. PzKpfw IVs – with a long 7.5cm KwK 40 L/43 with good capabilities against the T-34 at all normal ranges – began to arrive in March, but only small batches joined the Panzer force in 1942.

The real driver of heavy Soviet tank losses in 1942 remained German tactical superiority. The Panzer divisions' highly experienced and better-trained crews, and excellent small unit leadership, gave them a major tactical advantage over their opponents. Due to the need to replace the huge losses faced by the Red Army, Soviet tank crew training was extremely basic and often short, at times consisting of a week or two of classroom instruction and a few perfunctory field exercises focused on simple maneuvers in column and line before personnel were rushed to the front. Crew member training predominantly consisted of repetitive drills, such as the hull machine gunner repeatedly changing the drums on the forward DT 7.62mm machine gun. There was little or no training in tactical maneuvers or the use of ground, leading to the typical Soviet tactic of approaching in column and deploying to line for frontal attacks on enemy positions, with the tanks instructed to fire on the move in the general direction of the enemy. In contrast, German tank training was much lengthier and more extensive, with crews cross-trained for all

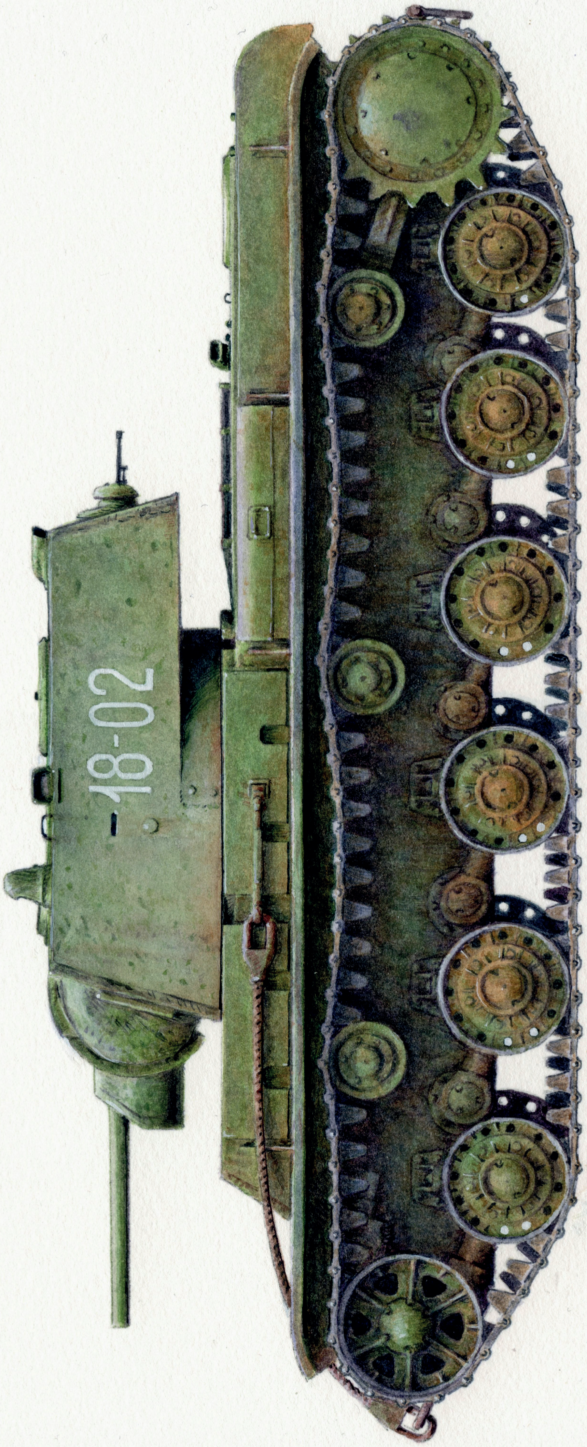
A T-34 crosses a water obstacle with its tank *desant* troops aboard. The T-34's powerful diesel engine and wide tracks gave it exceptional off-road mobility even in the poor terrain conditions and weather typical of the Eastern Front. Although in 1942 the inexperienced workforce and rush to rapidly produce as many tanks as possible resulted in numbers reaching the troops with mechanical faults, overall, the T-34 design remained extremely reliable. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

B

KV-1 HEAVY TANK

1. KV-1 Heavy Tank, 133rd Heavy Tank Brigade. The KV-1 heavy tank inspired a measure of "tank panic" among German infantry units in 1941 as their 3.7cm standard antitank guns were ineffective against the KV's heavy armor. By 1942, however, the Wehrmacht had improved main guns on its latest PzKpfw III and IV tank models and sent better armor-piercing ammunition to the front, giving a better capability against the KV-1s. As the KV-1 was too slow to keep up with T-34s and too heavy for most bridges, the majority of them were reorganized into separate heavy tank brigades or breakthrough tank regiments by mid-to-late 1942. The top illustration shows a KV-1 from the 133rd Heavy Tank Brigade, which operated with the Stalingrad Front from August to October 1942. The tank carries the earlier L-11 shorter-barreled 76.2mm main armament.

2. KV-1S Heavy Tank, 5th Heavy Tank Regiment. By early 1942, the shortcomings of the KV-1 were becoming increasingly apparent, particularly its poor mobility. As a result, the Soviets developed the lighter KV-1S version, lowering the tank's weight by reducing the armor and using a lighter turret. The design was fielded in late 1942 in time for Operation *Uranus*, but by 1943 production was discontinued as the T-34 carried the same armament in a better overall tank. The plate shows a KV-1S from the 5th Heavy Tank Regiment – soon designated the 5th Guards Tank Regiment – which carried the name of I. D. Papanin, a Soviet polar explorer, as the unit's tanks were financed by workers in the Soviet arctic. The 5th operated under the Don Front during Operation *Uranus*.



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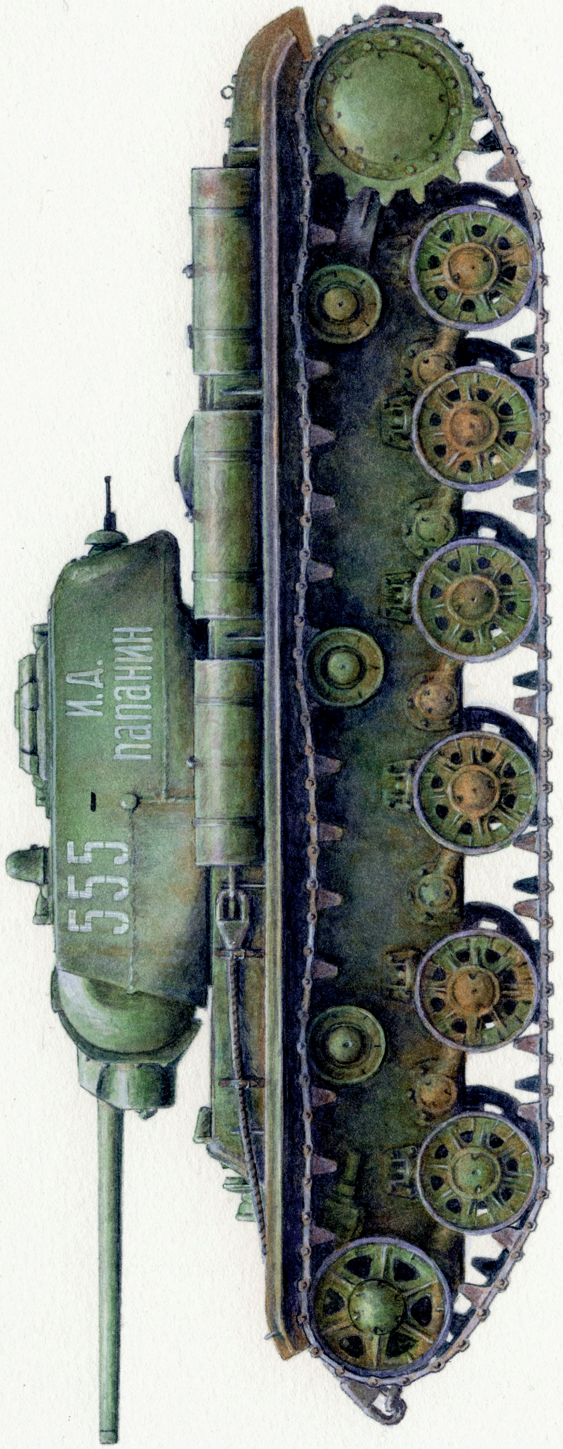
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positions and intensive use made of tank training ranges to exercise complex maneuvers, learn to use terrain for cover, and rapidly engage pop-up targets.

In combat, Soviet tanks typically moved in follow-the-leader formations, launched frontal attacks on enemy positions without regard for fields of fire or terrain, and were slow to identify and fire on targets. Unlike the Panzers, Red Army tank units did not use overwatch techniques (covering fire) when moving into contact with the enemy. Poorly trained Soviet crews often bailed out when their tanks broke down or were hit, abandoning large numbers of relatively undamaged tanks on the field in the early period of the war. By the summer of 1942, Red Army officers began to issue instructions that crews could only abandon burned tanks with catastrophic damage; those who bailed out of relatively intact tanks were subject to disciplinary action such as posting to penal battalions.

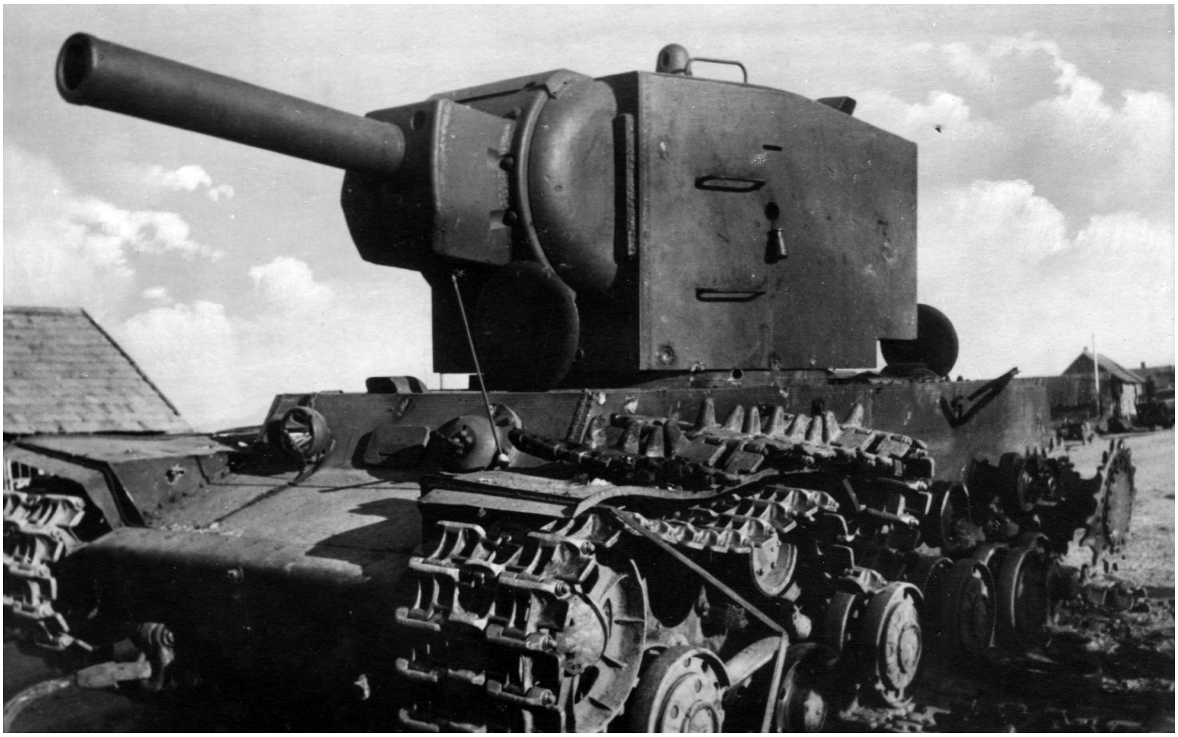
Technical characteristics

	T-34 Model 1943	**KV-1 Model 1941**	**KV-1S Model 1942**	**T-60 Model 1941**	**T-70 Model 1942**	**Matilda MK.2**	**Valentine MK.3**	**M3L Stuart**	**M3S Lee**
Crew	4	5	5	2	2	4	3	4	7
Weight (tons)	30.9	47.5	42.5	6.4	9.8	26.9	16.3	12.4	27.2
Guns (caliber)	76.2	76.2	76.2	20	45	40	40	37	37 & 75
Machine guns	2	3	3	1	1	1	1	5	4
Combat load (shells)	100	114	102	780	90	93	79	103	178/50
Armor – turret/body (mm)	52/70	75/100	52/75	15/35	15/45	13/78	8/65	10/45	12/37
Speed (km/hr)	55	35	42	45	45	24	24	48	42
Road range (km)	300	250	250	450	250	256	144	113	190

KV-1 and KV-1S

At the same time as Koshkin was developing the T-34, the Soviets looked to replace their multi-turreted T-35 heavy tank, spurred by the need to improve capabilities against enemy bunkers such as those encountered during the 1939–40 war with Finland. The effort began with a five-turret design, revised to three, and then, after Stalin himself snapped one of the turrets off a model with the comment that "a tank should not be a department store," soon resolved on a single turret design. The new heavy tank was designated the KV-1 after the Commissar of Defense and Stalin crony Kliment Voroshilov and carried the same 76.2mm main armament as the T-34 but with heavier armor. To improve capabilities against bunkers, a few hundred KV-2s with the same chassis but a high, narrow turret carrying a 152mm howitzer were produced, but most were lost during 1941.

The KV-1's armor proved impervious to the standard German 3.7cm antitank gun and most other weapons available in 1941, leading to instances of tank panic among the infantry. Only heavy artillery or the 8.8cm antiaircraft gun proved able to halt the KVs, but despite its initial psychological impact, the KV design suffered from many limitations. The KV-1 had reliability problems, especially with its clutch and powertrain, and the 47-ton tank was too heavy to cross the Red Army's standard pontoon bridges. Despite its five-man crew, the KV-1 had a poor turret crew layout that hindered effective operations; it had a dedicated gunner but the commander also had to serve in the loader role. The third crewman in the turret was an assistant driver assigned to relieve the driver when needed, do tank maintenance, and



A knocked out KV-2 in 1941. Several hundred KV-2s were produced in 1941 with a large turret mounting a 152mm howitzer intended to be used against enemy bunkers such as those the Red Army encountered on the Mannerheim Line during the war with Finland. Most KV-2s were lost during the initial months of the German invasion, and the Soviets focused production on the more useful KV-1. By 1943, the 152mm would return to the Red Army's armored order of battle, now carried by the SU-152. (Nik Cornish at www.Stavka.photos)

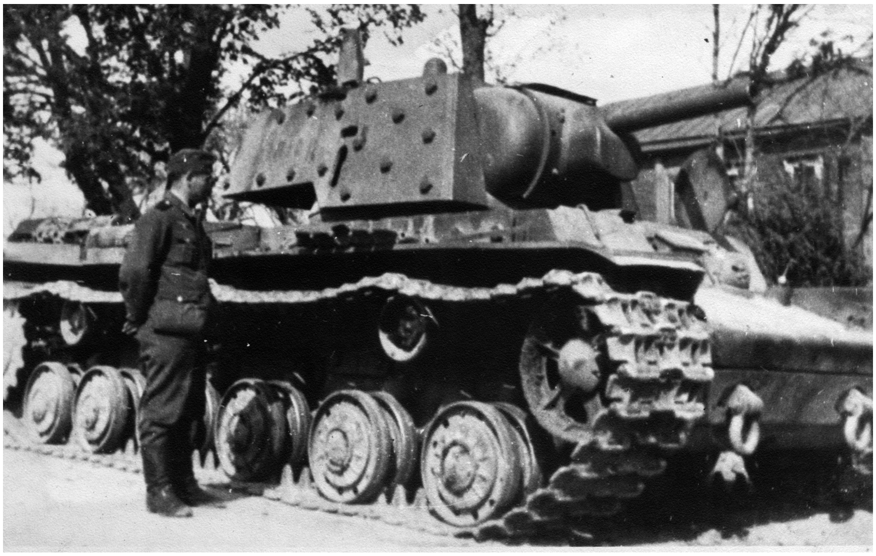
in combat man a rear-facing machine gun intended to keep enemy infantry from attacking by mounting the tank deck.

By 1942, as German capabilities to engage the KV improved, its utility came increasingly into question as it offered no firepower advantage over the less expensive and more mobile and reliable T-34. Differences in speed and mobility hindered the ability of the early 1942 tank brigades with their mixes of T-34s, T-60s, and KV-1s to keep their tanks together, and soon the heavier KVs were removed and formed into separate tank brigades and regiments for infantry support. To give the KV continued utility, a lighter version with less armor but higher speed, the KV-1S, was designed during 1942 and began to reach the force by the end of the year. The turret was redesigned and had a better crew arrangement with a designated gunner, loader, and commander. Ultimately, 1,370 would be produced before the decision was taken in April 1943 to halt all KV production in favor of improved T-34 designs.

T-60 and T-70

The Red Army had produced small amphibious light tanks for scouting missions during the 1930s, and as the war began had produced 81 of the new, 12.7mm machine-gun-armed T-40s to replace the prewar T-38 for this role. With the huge losses of *Barbarossa*, however, the Soviets terminated production of the more complex T-40, only 230 of which ultimately left the factories, in favor of the simpler, non-amphibious T-60. The T-60 was powered by a GAZ truck engine, allowing automotive factories to rapidly shift to tank production. With too few T-34s available to meet requirements, light tanks were used to fill out the tank brigades, which typically had one T-34 and one T-60 or T-70 battalion. A total of 6,022 T-60s left the factories before production ended in September 1942.

An early-production KV-1 abandoned in 1941. This tank carries the shorter-barreled L-11, also used on the first T-34s, and soon replaced on both tanks with a longer and more effective version of the 76.2mm main gun. The heavy armor of the KVs led to panic among some German units, as they were able to break through defense positions impervious to most weapons in the Wehrmacht's arsenal. In many cases, only direct hits by 8.8cm antiaircraft guns could penetrate the KV-1's frontal armor. (Nik Cornish at www.Stavka.photos)



Soviet 1942 tank production

Type	Jan–Mar	Apr–Jun	Jul–Sep	Oct–Dec	Total
KV heavy	764	879	890	0	2,533
T-34 medium	1,605	2,651	3,946	4,376	12,578
T-70 light	322	2,066	4,020	2,376	8,784
T-60 light	2,353	1,017	318	0	3,688
SU-76	0	0	0	25	25
SU-122	0	0	0	25	25
Total	5,044	6,613	9,174	6,802	27,633

The T-60 was originally to carry the same 12.7mm heavy machine gun as the T-40, but during the design phase was upgraded to carry the same 20mm ShAK cannon used in Soviet aircraft. The T-60 carried a total of 780 belt-fed rounds for the 20mm in addition to a coaxial 7.62mm DT machine gun. The ShAK could only engage a PzKpfw III or IV effectively from the side or rear at short range, and in turn the light armor of the T-60

C

T-60 AND T-70 LIGHT TANKS

1. T-60 Light Tank, 22nd Tank Corps, Southwestern Front, July 1942. The T-60 light tank was a stopgap measure, designed to utilize truck factories to help replenish the Soviet armored force after the huge losses of 1941. The resulting T-60 was a basic two-man tank, armed with the same ShAK 20mm belt-fed cannon used on Soviet aircraft along with a coaxial 7.62mm DT machine gun, giving a capability against soft targets and German light vehicles but with little ability to defeat the PzKpfw III or IV. Although its capabilities were modest, shortages of T-34s led the Red Army to use a battalion of T-60 or T-70 light tanks along with a battalion of T-34s in its tank brigades. The tank portrayed fought with the Southwestern Front's 22nd Tank Corps in July 1942.

2. T-70 Light Tank, winter camouflage, 1942. A T-70 light tank in winter camouflage. The T-70 resulted from efforts to improve the T-60 and had more horsepower due to the use of two rather than one engine, and a 45mm main armament that could fire an HE shell against soft targets, as well as giving a better capability against Axis armor. The T-70 was still crippled in action by its two-man crew, as the tank commander in the turret was overburdened by the need to load, aim, and fire the 45mm main gun and coaxial machine gun, direct the driver and scan the battlefield.

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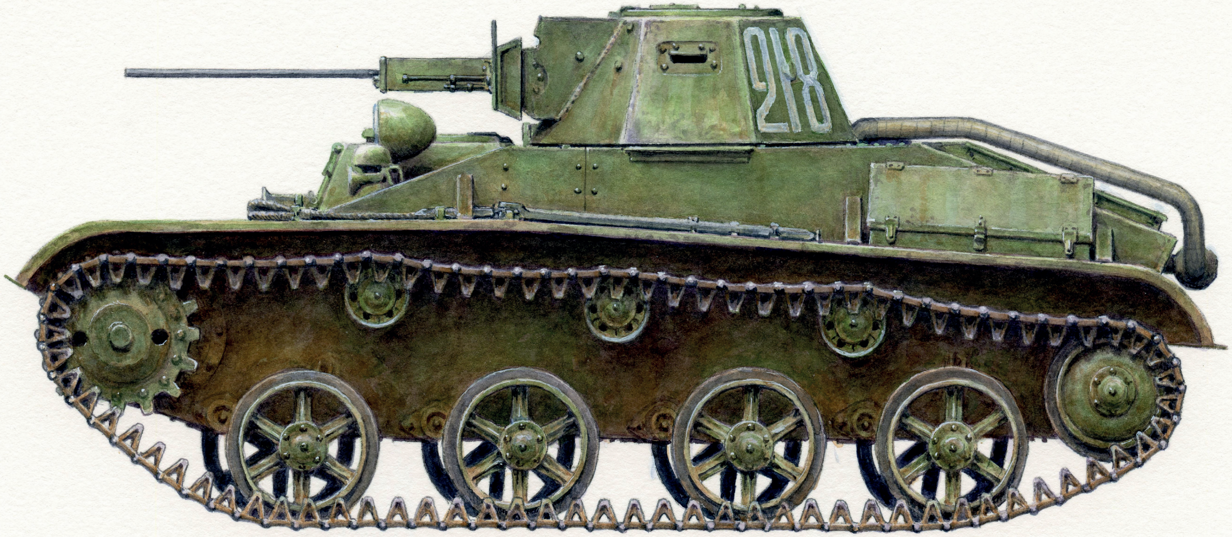

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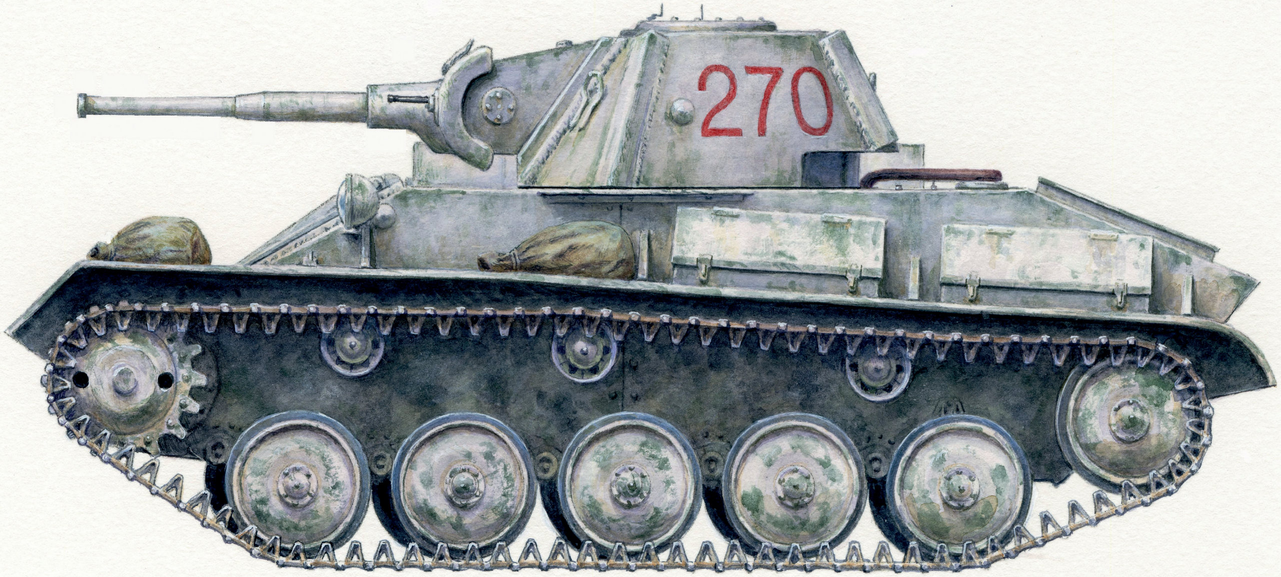
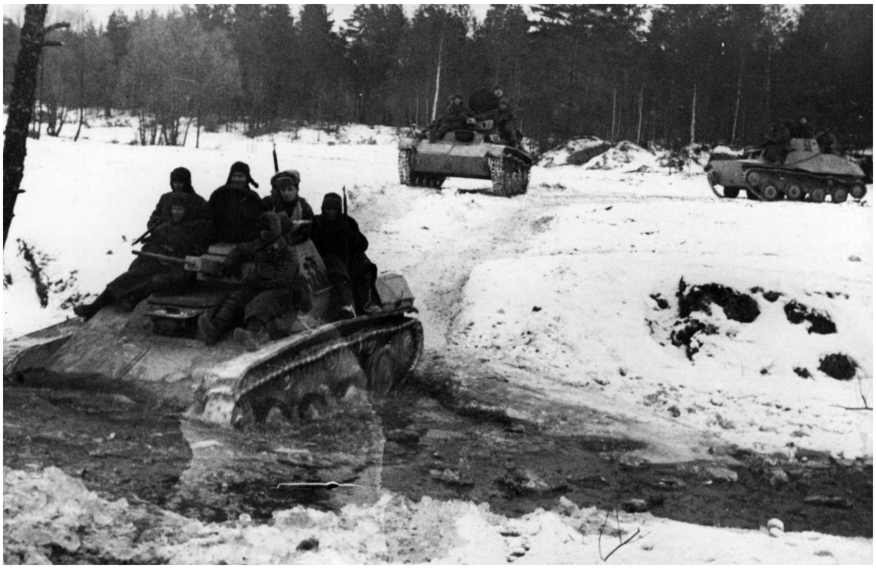


was extremely vulnerable to enemy fire, leading the tank to be dubbed the "BM-2" or *Bratskaya Mogila na dvoikh* – "a brother's grave for two" – by their crews. The T-60 was underpowered and slower than the T-34, and the T-60 battalions struggled to keep up with the T-34 battalions in the tank brigades. The T-60's two-man crew left the overburdened tank commander in the turret responsible for aiming, firing, and loading both the 20mm cannon and the coaxial machine gun while scanning for targets and directing the driver. If a platoon or company commander, he would also be forced to direct his unit's other tanks by standing in the turret and signaling with flags, as T-60s lacked radios. In later 1942, an improved T-60 was produced with a more powerful GAZ-203 engine and additional armor on the turret and hull; up to 35mm on the glacis and turret front and 25mm on the hull side.

The T-60 was rushed into service during the crisis of late 1941, with 48 T-60s of the 33rd Tank Brigade passing in review during the famous November 7 parade through Red Square and then moving directly to the front to meet the advancing Germans only 16km from Moscow. T-60 battalions served in most Soviet tank brigades during the first two years of the war, and proved useful in infantry support, command, and scout roles. Numbers in the force decreased as more T-70s began to enter service in 1942, but throughout the war T-60s continued to be used for driver training and to tow 57mm ZS-2 antitank and 76.2mm divisional guns.

Realizing the T-60's shortcomings, the Soviets rapidly began efforts to mount a larger main armament on an upgraded tank while retaining as many T-60 components as possible. The resulting T-70 was equipped with a 45mm gun, which had the ability to fire HE rounds and added a measure of capability against German tanks. The T-70 could carry 90 45mm rounds and had a 7.62mm DT coaxial machine gun mounted with the main gun. To increase horsepower, the T-70 was equipped with two GAZ engines rather than one but originally had a flawed design with an engine separately powering each track. This arrangement proved unsuccessful as a problem with one engine would cripple the tank, and before entering active operations



T-60s transporting infantry across difficult winter terrain. Although it had little capability against German medium tanks, the T-60's 20mm main armament could engage lighter Axis armored vehicles and proved effective in the infantry support role. (From the fonds of the RGAKFD in Krasnogorsk via Stavka) a revised design was used with the engines in-line on the right side of the hull and using a traditional transmission to control the tank. The new version with the in-line engines was formally designated the T-70M, although all the tanks were called T-70s at the front.

Although it had a superior main armament, the T-70 suffered from the same two-man crew arrangement as the T-60. The T-70 increased the overburdened tank commander's tasks in the turret, as the 45mm had to have each shell manually loaded while the T-60's 20mm was belt-fed. There were 8,226 T-70s produced before adequate numbers of T-34s had entered the force in late 1943 to fully outfit the tank brigades, and T-70 factories shifted to producing the SU-76 self-propelled gun. Oddly, the same poor design decision from the original T-70 was repeated in the initial SU-76, with an engine linked to each track, leading to a similar in-line redesign and designation as SU-76M. The SU-76 carried a version of the standard Soviet 76.2mm divisional gun mounted on the light T-70 chassis, providing an excellent source of mobile armored firepower to support attacks by the Red Army's infantry and armored formations from 1943 to 1945. Over 14,000 were built, making its total production second only to the T-34.

Lend-lease tanks

In addition to filling out the force with T-60 and T-70 light tanks, the Red Army was forced to make extensive front-line use of the lend-lease tanks it received from the Western allies. Due to the massive tank losses of 1941, and the lag in production as the relocated factories in the Urals reestablished themselves, lend-lease tanks played their most prominent role on the Eastern Front during late 1941 and 1942. Although Britain only had 1,770 tanks in service in mid-1941, 780 of them fighting in North Africa, the US and Britain agreed to provide the Soviet Union 500 tanks a month from October 1941 to June 1942. Heavy German air and submarine attacks on the Arctic convoys shipping the tanks to Murmansk sank 740 of the initial 4,161 tanks dispatched. After convoy PQ 17 lost 22 of its 33 ships in June, the convoys were halted for two months and of the 4,500 tanks promised, 3,421

The Red Army also employed T-60s as utility vehicles, towing antitank guns or 76mm divisional guns. German forces made similar use of captured T-60s to tow guns, while using others in security or counter-partisan operations. (From the fonds of the RGAKFD in Krasnogorsk via Stavka) ultimately arrived in the USSR. A Second Protocol negotiation covered July 1942 to June 1943 and called for 3,000 British and 7,000 US tanks to be sent to the Red Army. Deliveries in 1942 were improved by use of the Persian Gulf corridor route opened after the joint Anglo-Soviet invasion of Iran in August 1941.

The first lend-lease tanks to arrive were 145 Matildas and 259 Valentines in 1941. The tanks were rushed into the battles to defend Moscow to help compensate for the Red Army's huge losses in the first months of *Barbarossa*. The Soviets called the Matildas MK.2s and the Valentines MK.3s irrespective of the specific model of the tank, and both types would continue to play a major role in Red Army operations into 1942. The Soviets liked the MK.2's heavy armor, equal to that of the KV-1, but were critical of its poor mobility in muddy and winter conditions. The Matilda had only been designed for operations in temperatures of zero degrees Celsius but the 1941–42 winter saw temperatures as low as minus 28 degrees. Later shipments of Matildas were sent with antifreeze already in the tanks to help cope with cold weather conditions. The narrow tracks had poor traction, and the suspension often became clogged as mud or snow built up under the tank's side armor. The Matilda's two bus engines also increased the maintenance burden. The Soviets requested Valentines rather than more Matildas, but due to industrial limitations Britain continued to send mixes of both types during 1942. A total of 1,084 Matildas were ultimately shipped, with 918 reaching the USSR, about a third of the tank's total 2,987 production run.

The Red Army preferred the Valentine tank, which had a better suspension, a more powerful engine, and, unusually for an early-war British tank, good reliability. The Valentine was originally designed as a cheaper and easier-to-produce replacement for the Matilda. Although it was extensively used in North Africa, the British considered the Valentine obsolete as early as 1941. The Red Army's view of the Valentine's utility increased once models with the improved 57mm 6-pdr gun were available in 1943, and production lines were kept open to meet Soviet requirements into 1944. Ultimately, counting both the tank and variants using its chassis, the Valentine would be the most-produced British armored fighting vehicle of the war and would ultimately make up 75 percent of the British-designed tanks sent to the Soviet Union.

The Red Army considered the 40mm (2-pdr) main armament carried by both the Matildas and Valentines arriving in 1942 to be a major limitation in their overall effectiveness. The British gun had a similar capability against enemy tanks as the 45mm used on the Soviet T-26, BTs, and T-70, but lacked the 45mm's ability to fire a useful HE shell, critical as engagements with enemy field fortifications and soft targets were much more common than tank-against-tank actions. The Soviets

A camouflaged T-70. Although it had more engine power and a much superior armament, the T-70 was, like the T-60 it was intended to replace, severely hindered in action by its one-man turret crew. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

experimented with installing a 76.2mm gun in a Matilda turret but did not pursue production, and the Valentine's turret was too small for the larger gun. Some 40mm Bofors HE shells were modified to be used in the 2-pdr, but this effort was also not pursued. To help with the issue, Britain eventually sent 156 Close Support Matildas equipped with the 3in. howitzer, with 125 arriving safely.

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During September 1941, British factory workers at the Ruston & Hornsby factory in Lincoln, England, paint messages of support on a Matilda infantry tank being prepared for shipment to the USSR. Matildas made up a major portion of the first lend-lease tank shipments and played a major role in the defense of Moscow in December 1941. (Reg Speller/ Fox Photos/Hulton Archive/ Getty Images)

British lend-lease tanks played a major role in the winter defense of Moscow, and in 1942 the Soviets also used them in several of their newly formed tank and mechanized corps, much as the British had to employ Valentine infantry tanks in their armored divisions the same year due to shortages of more suitable cruiser tanks. The 10th Tank Corps, formed in Moscow's Military District, had two of its six tank battalions equipped with Matildas, and the 11th Tank Corps formed the next month also had four of its six tank battalions similarly outfitted. The 11th operated in the July battles on the Don River under the command of the 5th Tank Army, beginning the campaign with 88 Matildas, and was reduced to 15 operational after ten days of combat. The 5th Mechanized Corps was formed in September completely equipped with Matildas and Valentines, and in December had to use them to help repulse the German *Winter Storm* attempt to relieve Stalingrad when it was first sent into action.

US-designed lend-lease tanks also soon arrived in the USSR, meeting a similarly mixed response from the Red Army. The early tanks were M3 Lee Mediums – designated M3S (for *sredniy*, medium) by the Soviets – and M3 Stuart Lights (M3L, for *legkhiy* or light). Ultimately, 1,676 Stuarts and 1,152 M3 Lees were shipped to the USSR. The Red Army considered the M3L Stuart too high and noted traction issues with its narrow rubber tracks. They also regarded the two sponson-mounted machine guns to be useless, as they

A Matilda supporting dug-in Soviet infantry in winter camouflage, with the two troops on the right manning an antitank rifle. While Matildas, with their slow speed, were effective infantry support tanks, the Red Army was forced to equip all or part of several tank and mechanized corps with them in 1942 due to the shortage of T-34s. (Sovfoto/ Universal Images Group via Getty Images)

A disabled Valentine MK.3 tank. The Soviets used the first shipments of Valentines as main battle tanks, despite dissatisfaction with its 2-pdr 40mm main gun, which was unable to fire an effective high explosive shell. Beginning in 1943, the Red Army requested additional Valentines, now carrying more-capable 6-pdr 57mm guns, which it used during the later years of the war in the light tank role. (Nik Cornish at www.Stavka.photos)

could only fire forward, and these were typically removed in Soviet Stuarts. The 37mm main gun, however, combined a measure of anti-armor capability with the ability to fire useful HE shells, unlike the 2-pdr on the British tanks. While not generally admitted by the Red Army, while inferior to the T-34, the Stuart with its four-man crew, radio, and better armament was clearly superior to the T-60 and T-70.

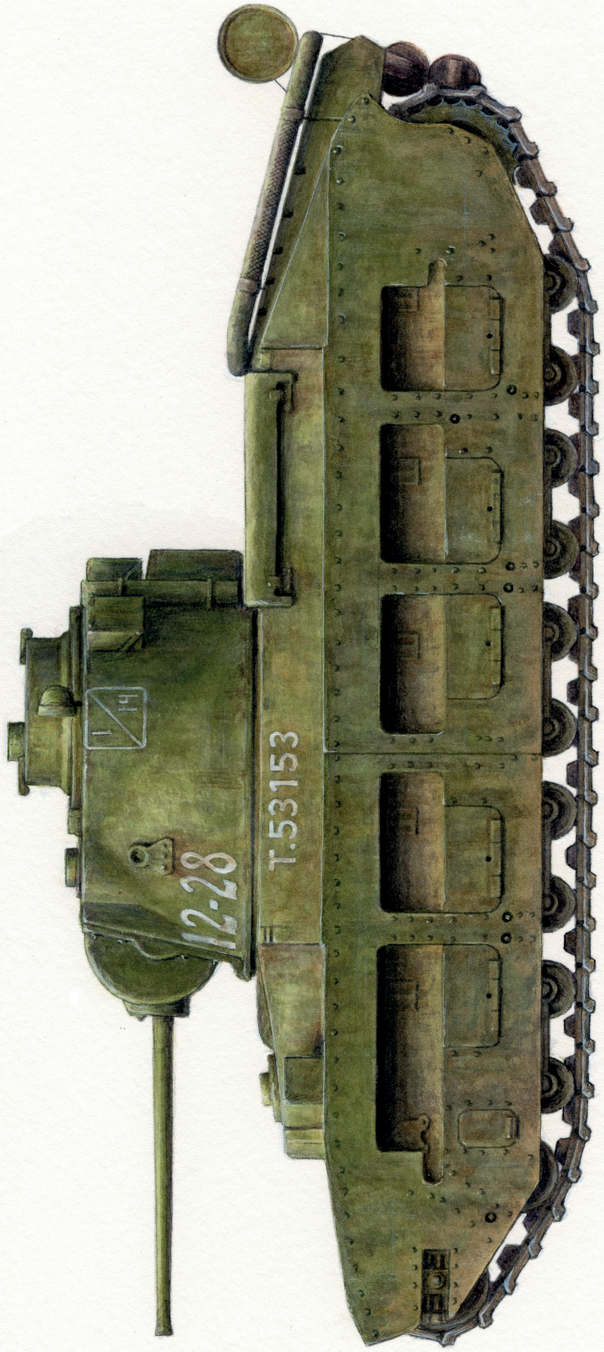
British tank crews in North Africa were glad to receive shipments of US M3 Mediums in 1942, as the tank's 75mm main gun gave it a capability against German tanks lacking in the 2-pdr that equipped most of their tanks. The Red Army's medium T-34s and heavy KV-1s were already equipped with the effective 76.2mm, however, making the US M3 with

D

MATILDA AND VALENTINE TANKS

1. Matilda MK.2 Tank, 38th Tank Brigade, May 1942. Although disliked for its slow speed, poor mobility in snowy and muddy conditions, and inferior 2-pdr (40mm) main armament, Matilda IIs were some of the first tanks to reach the USSR from the West and were soon put into action in December 1941 in the defense of Moscow. Known as the MK.2 in Soviet service, Matildas played a major role in operations in 1942. The Matilda portrayed was part of the 38th Tank Brigade, attached to the 6th Army at the disastrous Red Army May 1942 attack aimed at encircling German forces at Kharkov. Soviet tanks did not carry standardized markings for security purposes, but individual commanders often had their tanks carry specific markings for operations. This Matilda also still carries the partially obscured original British identification number. The 38th Brigade was trapped and destroyed by the Wehrmacht counterattack at Kharkov, and not reformed.

2. Valentine Tank (MK.3), 36th Tank Brigade, Second Battle of Kharkov, 1942. A Valentine tank assigned to the 22nd Tank Corps' 36th Tank Brigade during the Second Battle of Kharkov, May 1942. All models of Valentine were sent to the USSR during the war, except the initial MK.1, and this model is a MK.4, equipped with a US-made GMC 6004 diesel engine and a US transmission. The Red Army favored diesel engines for its tank force, and requested lend-lease variants be so equipped. Although technically a MK.4, the Soviets referred to all Valentines they received as MK.3s and all Matildas as MK.2s. The Red Army typically left lend-lease tanks in the paint scheme they carried on arrival, and this Valentine is painted British SCC No. 2 Brown. It carries the Lakeman flexible antiaircraft mount for a Bren machine gun atop the turret. The 22nd Tank Corps took heavy losses at Kharkov but, unlike the 21st, escaped the German envelopment and was reformed as the 5th Mechanized Corps, still equipped with British lend-lease tanks. The 5th was rushed to help stop the German *Winter Storm* attack to relieve Stalingrad in December 1942, where it had to halt the Panzers with its 2-pdr-armed Matildas and Valentines.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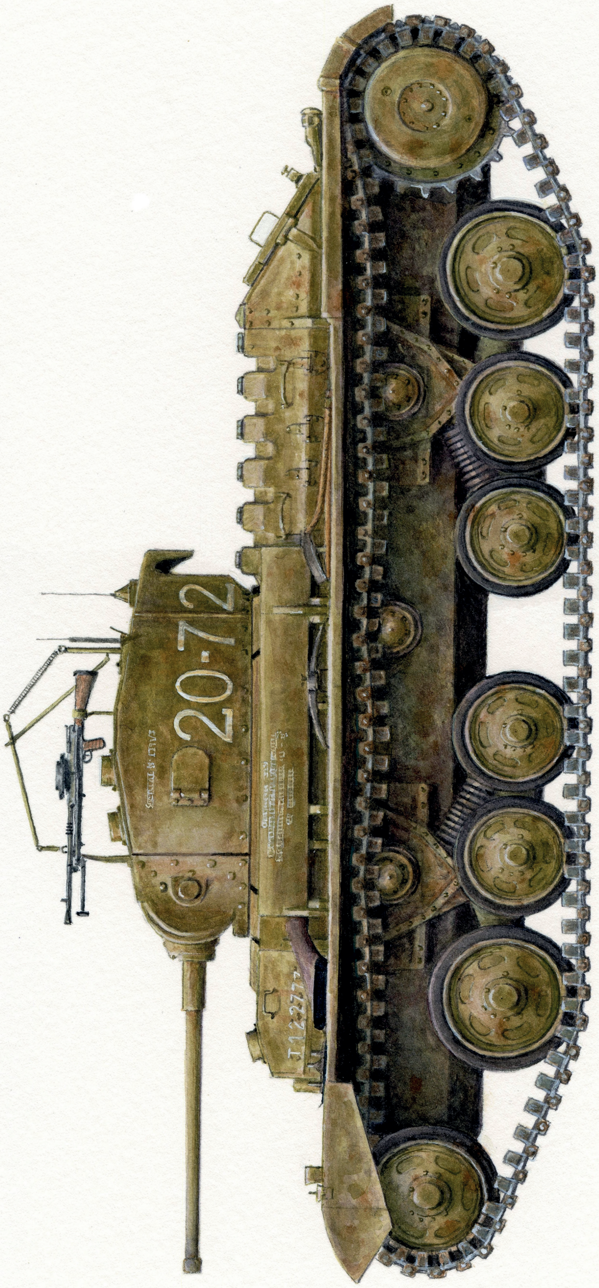

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A Red Army M3L Stuart tank operating in winter conditions. Although clearly superior to the Soviet T-60 and T-70 light tank, the Red Army criticized the Stuart for its high profile and noted its narrow rubber tracks struggled in muddy or snowy terrain typical of the Eastern Front. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

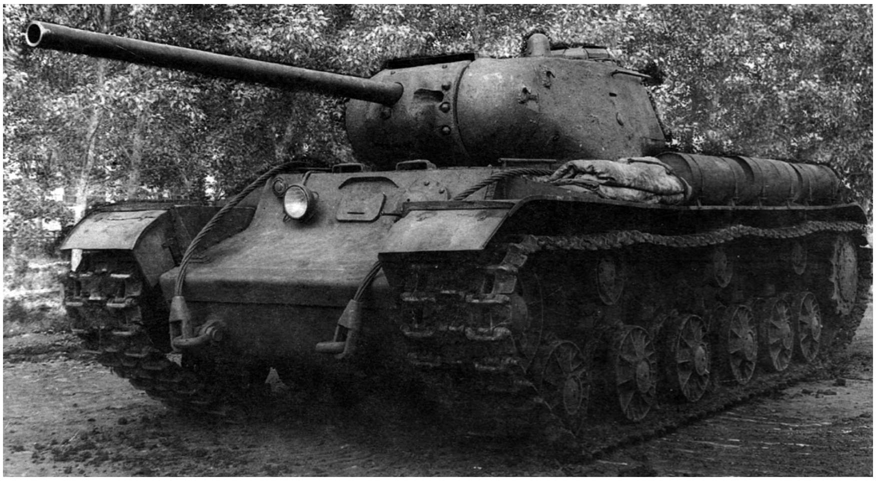
its sponson-mounted and traverse-limited 75mm less desirable. The M3Ss had Continental radial engines rather than the diesel-fueled types favored by the Soviets, and weaker armor than the T-34, while its height made it particularly vulnerable on the battlefield. The first M3 mediums arrived in 1942, and although almost all were in the original US configuration with a seven-man crew, called Lees by the British, the Soviets typically called the tanks they received Grants.

THE CAMPAIGN

As Stalin's winter offensive ground to a halt in early 1942, the Soviet high command expected a renewed German offensive against Moscow in the center. Hitler, however, chose to strike in the south to capture the Caucasus oil fields for the Reich and deny them to the Soviet war machine. The 1942 campaign would soon see the Red Army's newly formed tank corps and armies thrown into a series of desperate counterattacks to check the German offensive.

Kerch and the second battle of Kharkov

The first major armored clashes in spring 1942 were the result of preliminary operations in the Crimea and around Kharkov. The Soviets had secured a bridgehead in the Crimea during the winter by attacking over the Kerch Strait. Although their tank brigades and regiments heavily outnumbered the opposing German Eleventh Army's small armored resources, Soviet attempts to break out failed due to mines, exposed open terrain, and attacks by the Luftwaffe. Reinforced by the 22nd Panzer Division, the Germans launched Operation *Trappenjagd* (Bustard Hunt) against the bridgehead on May 8. Although the defenders had four tank brigades and three independent tank battalions with a total of 230 tanks, the Eleventh Army's attack rapidly broke through Soviet lines, aided by StuG III assault guns and powerful Luftwaffe strikes. The Panzers of the 22nd Panzer Division exploited the penetration,



A KV-1S tank. To make the basic KV-1 design more viable, Soviet designers produced the KV-1S *Skorostnoy* (high speed) variant. To be better able to keep up with offensive operations, the KV-1S had lighter armor, but retained the same 76.2mm main armament as the KV-1 and T-34. Production began in August 1942, and a number were in the force later in the year. In total, 1,370 were produced, but it became apparent that the variant offered no improvement over the T-34, and as it was more expensive, production was halted in 1943. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

defeated a counterattack by knocking out 48 Soviet tanks, and soon cut off and destroyed the Red Army forces. The engagement cost the Soviets 238 tanks, including 41 KV-1s, at a cost of only eight Panzers destroyed.

As the Soviet high command assumed German forces were massing to attack Moscow, in May it decided to preemptively attack what were thought to be the weakly held lines in the south. The planned offensive was to encircle Army Group South's Sixth Army at Kharkov by striking from the north and from a Soviet-held salient around Izyum just south of the city. The Red Army massed about 640,000 troops and 19 tank brigades, and two of the newly formed tank corps, the 21st and 22nd, were attached to the southern attacking wing at Izyum to exploit the planned breakthrough and complete the encirclement. The Soviet force included 883 tanks, including 255 T-34s and 81 KV-1s. The rest of the force consisted of lend-lease British tanks, obsolete BT fast tanks, and T-60s.

Soviet operational tank strength for the Kharkov offensive, May 12, 1942

Formation	KV-1	T-34	BT	Matilda/ Valentine	T-60	Other	Total
21 Army	6	4	8	0	0	42	60
28 Army	33	78	7	0	60	3	181
38 Army	0	22	29	28/20	17	9	125
Northern Axis total	39	104	44	28/20	77	54	366
6 Army	11	34	0	57/0	63	1	166
AG Bobkin	7	5	10	0	17	1	40
21 Tank Corps	20	38	0	10/20	48	0	136
23 Tank Corps	0	58	0	0/30	45	0	133
Southern Axis total	38	135	10	67/50	173	2	475
9 Army	4	16	0	0	20	2	42
Overall total	81	255	54	95/70	270	58	883

Unknown to the Soviet high command, Army Group South was to launch the major German summer offensive effort of 1942 and the Wehrmacht's forces in the Kharkov area were being rebuilt and reinforced. When the Red Army's offensive began on May 13, the northern thrust by the 21st and 38th Armies made good initial progress into German lines, but Soviet

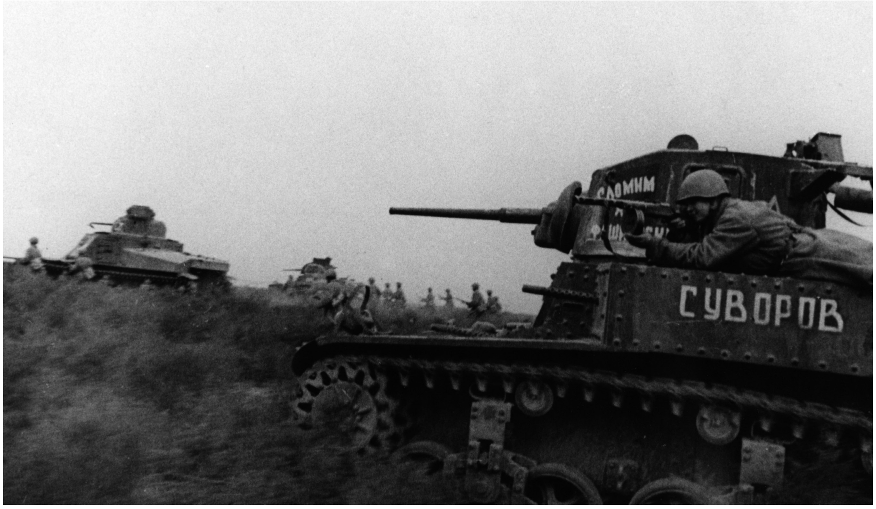
An M3S Lee tank in Soviet service. The M3S's design was obsolescent by 1942, with its side-mounted 75mm gun having a limited traverse and ability to engage enemy targets, and a separate 37mm in a rotating turret above. The Red Army, already equipped with the 76.2mm in its T-34s and KV-1s, was not impressed with the Lee's 75mm, and disliked the M3S's weaker armor and high profile. (Nik Cornish at www.Stavka.photos)

logistical and command and control preparations for the offensive were poor, and the attack was soon halted and pushed back by the 3rd and 23rd Panzer Divisions. The Soviet 6th Army and Army Group Bodkin made up the force attacking from the Izyum salient, with five tank brigades in direct support and the two tank corps and a cavalry corps standing by to exploit the expected breakthrough. The southern attack began on May 12 and had more sustained success. The two new tank corps were committed to exploit the breach on May 17 but only made a disappointing 10km on their first day in action. On the same day, the German First Panzer Army began an attack from the south against the base of the Soviet salient, weakly defended by the Soviet 9th Army with only two tank brigades totaling 42 tanks, 20 of them T-60s. On the 21st, the First Panzer and German Sixth Army met, encircling a major portion of the attacking Red Army force.

The Panzer divisions, rebuilt for the German summer offensive, were at the height of their effectiveness, and the presence of a number of PzKpfw IIIs and IVs with the longer 5.0cm and 7.5cm main armament gave the Germans an improved tank-against-tank capability against the T-34. Fliegerkorps VIII, the Luftwaffe's preeminent ground attack force, was rushed to support the counterattack with intense ground support strikes on the stalled Soviet tank columns. The 21st Tank Corps was encircled and destroyed, and never rejoined the order of battle, and the 22nd suffered heavy losses. After the destruction of the Kharkov attack force, the Luftwaffe returned to the Crimea to support the Eleventh Army's final assault on the Soviet fortress of Sevastopol, which fell on July 4. In total, the Red Army had lost 612,000 casualties and 1,400 tanks from May 10 to July 4, at a cost to Army Group South of 67,000 casualties and 140 tanks. The disastrous losses weakened Red Army defenses in the south and paved the way for the successful German launch of Operation *Fall Blau* on June 28.

Operation *Fall Blau*

The rebuilt Army Group South had 1,582 tanks and assault guns in its nine Panzer and six motorized divisions, about 70 percent of the German armor on the Eastern Front, and received all the latest up-gunned PzKpfw III and IV models sent to the east. By the start of the summer offensive, designated Operation *Fall Blau*, the Soviet tank force included 22 tank corps and 98 separate tank brigades. Eleven of the tank corps and 22 of the separate brigades were stationed in the south with the Bryansk and Southwestern Fronts, totaling 2,740 tanks, about 30 percent of the overall force. After the defeat at Kharkov, Stavka decided to organize the first tank armies, with the new 3rd Tank Army kept in the high command reserve near Moscow, and the 5th assigned to the Bryansk Front. The 5th Tank Army had over 600 tanks, but few support units and no opportunity for army-level training.



A unit equipped with M3L Stuarts and, in the background, M3S Lees launching an attack north of Stalingrad. On September 23, the Stalingrad Front's 24th Army launched one of the many counterattacks conducted during the summer and fall against German Army Group B's northern flank, using the 167th Tank Brigade, which operated 29 Valentines and 21 T-70s, and the 244th Tank Brigade, with 23 Lees and 25 Stuarts. Artillery fire stripped the infantry off the tanks' decks, and the unsupported brigades lost almost all their number in the attack, with only three tanks from the 244th returning to Soviet lines intact. (Photo by Sovfoto/Universal Images Group via Getty Images)

Fall Blau opened on June 28 with thrusts by the Fourth Panzer and Sixth Armies towards the city of Voronezh. The Soviet high command considered the offensive to be the southern portion of the expected assault on Moscow and ordered vigorous counterattacks. The newly formed tank corps, intended for deep exploitation operations, were now rushed into hasty, poorly planned counterattacks. The 1st and 16th Tank Corps were the first to engage, soon followed by the 4th and 24th. The Soviet corps staffs were inexperienced, and the attacks were uncoordinated, unsupported by air or artillery, and launched over open terrain. The 1st Tank Corps led its assault with an experienced T-34 battalion but was surprised to be successfully engaged by new PzKpfw IVs with long 7.5cm guns at ranges of up to 1,200m. The T-34s were shot to pieces, and after only inflicting a 24-hour delay, the corps' survivors took up a ragged defensive line only to be speedily outflanked by the Panzer divisions and forced to retreat again.

A German solider examines a lightly damaged T-34. The Soviet medium tank's characteristics so impressed General Heinz Guderian in 1941 that he urged German industry make a copy for the Wehrmacht. A commission of industrial specialists arrived to study the T-34 later in the year, but recommended Germany pursue a superior design, which ultimately resulted in the 1943 fielding of the Panzer V Panther tank. (Nik Cornish at www.Stavka.photos)

Due to their hasty training, in 1942 Soviet crews often bailed out of tanks that broke down or took hits, leaving large numbers of abandoned and largely intact tanks littering the battlefield. The Red Army began to send such crews to penal units, allowing tankmen to only bail out of "burned" tanks that had taken catastrophic damage. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

German forces entered Voronezh on July 5, and Stalin demanded that the 5th Tank Army counterattack immediately. The 5th's 2nd, 7th, and 11th Tank Corps attacked piecemeal and with no artillery support on July 7. The Luftwaffe repeatedly struck the Red Army formations and hidden German antitank guns inflicted heavy losses. Ten days later, the 5th Tank Army had been reduced to less than one half its original strength, and in addition to losing 341 tanks suffered 8,000 personnel casualties. Of the 300 remaining tanks, only 148 were operational, and the rest damaged and out of action. To the south, on July 9 the First Panzer and Seventeenth Armies joined the offensive, striking towards Rostov. The first weeks of the German summer offensive had led the Soviets to launch a series of costly and unsuccessful counterattacks with their new tank corps and the 5th Tank Army against *Blau*'s northern flank, costing roughly 2,400 tanks from June 28 to July 24.

The drive to Stalingrad

With the advance to Voronezh complete, Hitler ordered Army Group South to divide into two wings. Army Group A with the First Panzer and Seventeenth Armies would advance into the Caucasus to seize the Soviet oil fields around Maikop, Grozny, and Baku, while Army Group B advanced along the line of the Don River towards Stalingrad to protect *Blau*'s flank. Stavka now realized that *Fall Blau* was the main German offensive effort for 1942, and began to form two new tank armies,

5th Tank Army strength, July 7–17, 1942

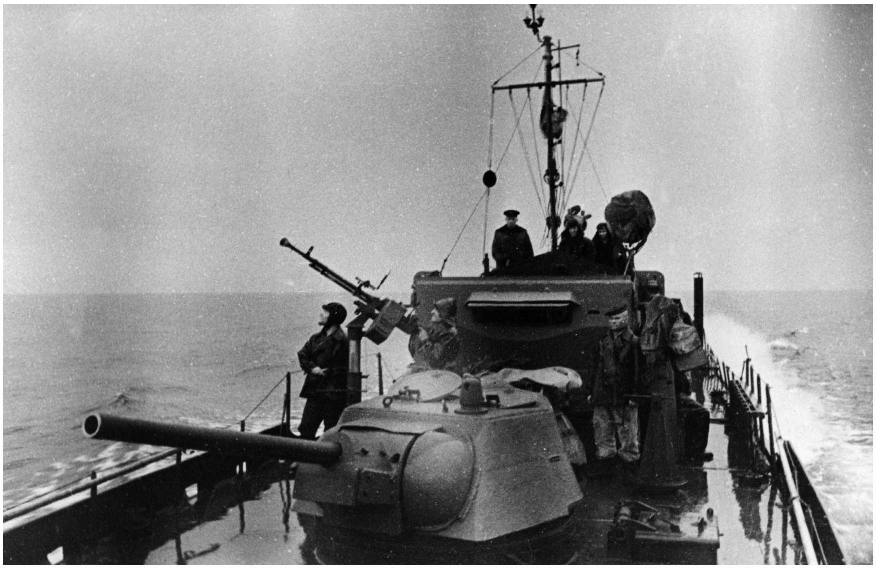
Unit	Tank type	Available 7/7	Operational 7/17	Under repair 7/17
	KV-1	26	0	0
	T-34	88	9	16
	T-60	69	30	0
2nd Tank Corps total		183	39	16
	KV-1	33	1	9
	T-34	96	14	38
	T-60	83	30	15
7th Tank Corps total		212	45	62
	KV-1	24	7	9
	Matilda (MK.2)	88	15	22
	T-60	69	22	30
11th Tank Corps total		181	44	61
	T-34	44	9	12
	T-60	21	10	2
19th Tank Brigade total		65	19	14
5th Tank Army totals		641	142	158

Stalingrad Front T-34s carrying their tank riders to the northwest, after breaking through the weakly held defenses of the Romanian Fourth Army. The 4th Mechanized, 13th Tank, and 4th Cavalry Corps formed the front's Operation *Uranus* exploitation force. (Photo by Sovfoto/Universal Images Group via Getty Images)

the 1st and 4th, to attack Army Group B. Stalin again demanded rapid action as the spearheads of General Friedrich Paulus' Sixth Army neared Stalingrad, ordering the tanks to attack on July 25. The 1st Tank Army had a total of seven tank brigades totaling 330 tanks, including 162 T-34s and 30 KV-1s, but only had a few hours to plan the attack, and could only feed the brigades over the Don River in piecemeal fashion. The 4th Tank Army soon joined the attack with an additional seven tank brigades with 370 tanks. The counterattacks led to sustained fighting, and delayed the advance on Stalingrad by a week, but cost the Red Army 600 tanks by the time their attacks ground to a halt at the end of the month.

By late August, Paulus' Sixth Army was within striking distance of Stalingrad itself, and General Hans-Valentin Hube's 16th Panzer Division reached the Volga just north of the city. Stalin ordered yet another counterattack against the German northern flank, once again by the 4th Tank Army. The 4th controlled the 2nd, 4th, and 16th Tank Corps along with the battered 23rd, totaling 600 tanks of which 50 were KV-1s, 250 T-34s, and the rest T-60/70s or lend-lease types. The attack was launched on August 26. The offensive cut off Hube's division, but German counterattacks soon regained contact, and the 4th Tank Army lost almost 500 tanks.

In September, the Soviet high command sought to launch a new offensive against the German northern flank to divert the Sixth Army from its attack into Stalingrad. General Kirill S. Moskalenko, available as his 1st Tank Army was virtually destroyed, was appointed to command the new 1st Guards Army for the attack with the 4th, 7th, and battered 16th Tank Corps under command. Moskalenko had about 123,000 troops and 340 tanks, including 42 KV-1s and 143 T-34s, but when the attack began on September 18 the



The Soviets employed tank turrets in a variety of roles, including mounting them on the armored gunboats in their riverine flotillas. The flotillas used purpose-built vessels with fast speeds, shallow drafts, armor, and firepower provided by tank turret guns to engage enemy vessels and provide fire support to army units fighting on the shore. Earlier gunboats had T-28 or T-35 turrets mounted, with wartime designs typically carrying T-34 turrets, along with 12.7mm heavy machine guns. Some of the gunboats had their aft tank turrets replaced with 82 or 132mm Katyusha multiple rocket launcher systems to provide improved fire support. (Sovfoto/Universal Images Group via Getty Images) well-prepared German defenders used new 7.5cm Pak 40 antitank guns along with their reliable 8.8cms to shoot the Red Army tanks to pieces as they approached over open ground. The Luftwaffe's ground attack aircraft added to the carnage, and the 1st Guards Army lost 106 tanks on the first day. Hube's 16th Panzer Division successfully counterattacked, with one German seven-tank-strong Panzer company destroying 22 Soviet tanks. Moskalenko's losses totaled 341 tanks.

Stalingrad, *Uranus*, and *Winter Storm*

With the Soviet tank attacks repulsed, the Germans turned the flank defenses on the Don River over to their Romanian allies while the Sixth Army was increasingly drawn into costly fighting to secure the city of Stalingrad. General Paulus began his deliberate offensive into the city on September 14. Hitler demanded the urban area be captured quickly, and due to his shortage of infantry Paulus sent his Panzer divisions into the fight. The Germans tried to use the PzKpfw IIIs and IVs as assault guns, but the tanks proved vulnerable to the 62nd Army defenders, especially when separated from their infantry support, and the Panzer divisions were soon reduced in strength. The 62nd had several tank brigades attached, with approximately 150 tanks in September, including some of the last T-34s produced by the Stalingrad Tractor Factory (STZ) just blocks behind the front line. During the weeks of fighting, the 62nd typically operated with at most 80 tanks at any one time, usually dug in and integrated with infantry strongpoints.

The grueling urban combat was costly to both sides, and the 62nd Army had to be continually reinforced by boat across the Volga despite the heavy German artillery and air attacks. Paulus' divisions were ground down and exhausted by November. The use of the Panzer and motorized divisions in the urban fighting left few mobile reserves to back up the long vulnerable flanks to the north and south of the city now held by the poorly equipped Romanian Third Army on Paulus' northern flank and the Fourth Army on his southern. The 48th Panzer Korps headquarters was assigned to backstop the Romanian Third Army, but it only controlled the 1st Romanian Armored and understrength 22nd Panzer Divisions.

A Soviet armored gunboat under fire. During the battle of Stalingrad, the Volga River Flotilla became the critical lifeline for the 62nd Army as it waged its house-by-house defense of the city. The flotilla was subordinated to Stalingrad Front in July and provided both transport services and fire support during the battle for the city. By November 18, the flotilla had transported 62,225 troops and 15,000 tons of ammunition over the Volga, while evacuating 44,790 wounded and civilians. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

With Paulus' Sixth Army pinned in the urban fighting and its flanks poorly protected, Stavka began planning an offensive, Operation *Uranus*, aimed at enveloping the Sixth Army in Stalingrad. General Nikolai Vatutin's Southwestern Front would launch the main assault from the north. His front included General Prokofy Romanenko's 5th Tank Army, with a strong force of rifle divisions attached to break through the Romanian Third Army's lines and the 1st and 26th Tank and the 8th Cavalry Corps to exploit through the beach. On the 5th Tank's left flank, Vatutin's 21st Army controlled the 4th Tank Corps and 3rd Cavalry Corps to join in the exploitation. General Konstantin Rokossovsky's Don Front on Vatutin's left flank was to attack to pin the Sixth Army's flank in place while the 5th Tank Army drove deep into the enemy rear area. On the Axis southern flank, Andrey Yeremenko's Stalingrad Front was assigned to break through the Romanian Fourth Army and drive north to complete the ring around the Sixth Army. For its deep exploitation mission, the Stalingrad Front controlled the 13th Tank Corps and the 4th Mechanized Corps, the first mechanized corps sent into action, along with the 4th Cavalry Corps.

The Soviet tank force at *Uranus*, November 19, 1942

Unit	Mobile corps	Heavy tanks	Medium tanks	Light tanks	Total
1st Guards Army	1st MC	0	113	50	163
5th Tank Army	1st, 26th TC, 8th CC	60	144	155	359
21st Army	4th TC, 3rd CC	85	57	57	199
Southwestern Front total		145	314	262	721
24th Army	16th TC	21	14	9	44
65th Army		10	22	17	49
66th Army		0	2	3	5
Don Front total		31	38	29	98
62nd Army		7	15	1	23
64th Army		1	27	12	40
51st Army	4th MC, 4th CC	0	118	89	207
57th Army	13th TC	4	122	99	225
28th Army		10	26	44	80
Stalingrad Front total		22	308	245	575
Grand total		198	660	536	1,394

TC = Tank Corps, MC = Mechanized Corps, CC = Cavalry Corps

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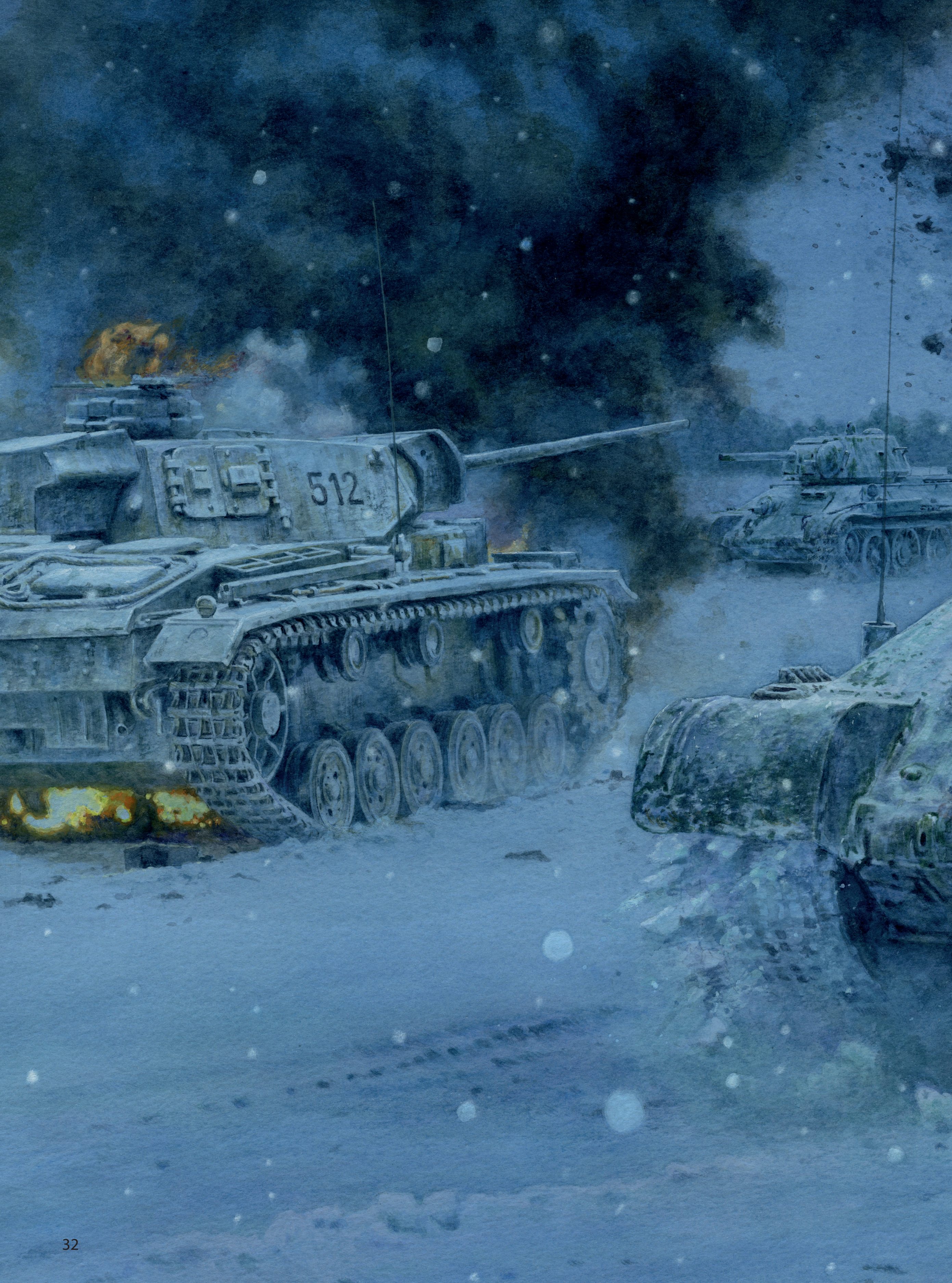
OPERATION *URANUS*

Operation *Uranus* was the most successful Red Army armored operation of 1942, shattering two Romanian armies and encircling and ultimately dooming the 300,000 troops of Paulus' Sixth Army in Stalingrad. After a day of fighting to break through the defending troops of the Romanian Third Army, the 1st and 26th Tank and 8th Cavalry Corps of the 5th Tank Army broke through and began to dash to the south. The 48th Panzer Korps, a relatively weak formation, moved up from reserve to block the Soviets. The 1st Tank Corps encountered *Kampfgruppe Oppeln* from the understrength 22nd Panzer Division near Peschanyi, resulting in a chaotic engagement during the evening and night hours of November 19–20 as shown here. T-34/76s are deploying to engage the German Panzers and passing a knocked-out PzKpfw III. The 1st Tank Corps was held up by the Germans into the 20th, and ultimately lost 50 of their 136 tanks, but the 26th Tank and 8th Cavalry Corps were able to drive south, along with the 21st Army's 4th Tank Corps. On November 23, the Soviet armor linked up with the 4th Mechanized Corps of Yeremenko's Stalingrad Front, which broke through the Romanian Fourth Army and advanced north, encircling Paulus' army.



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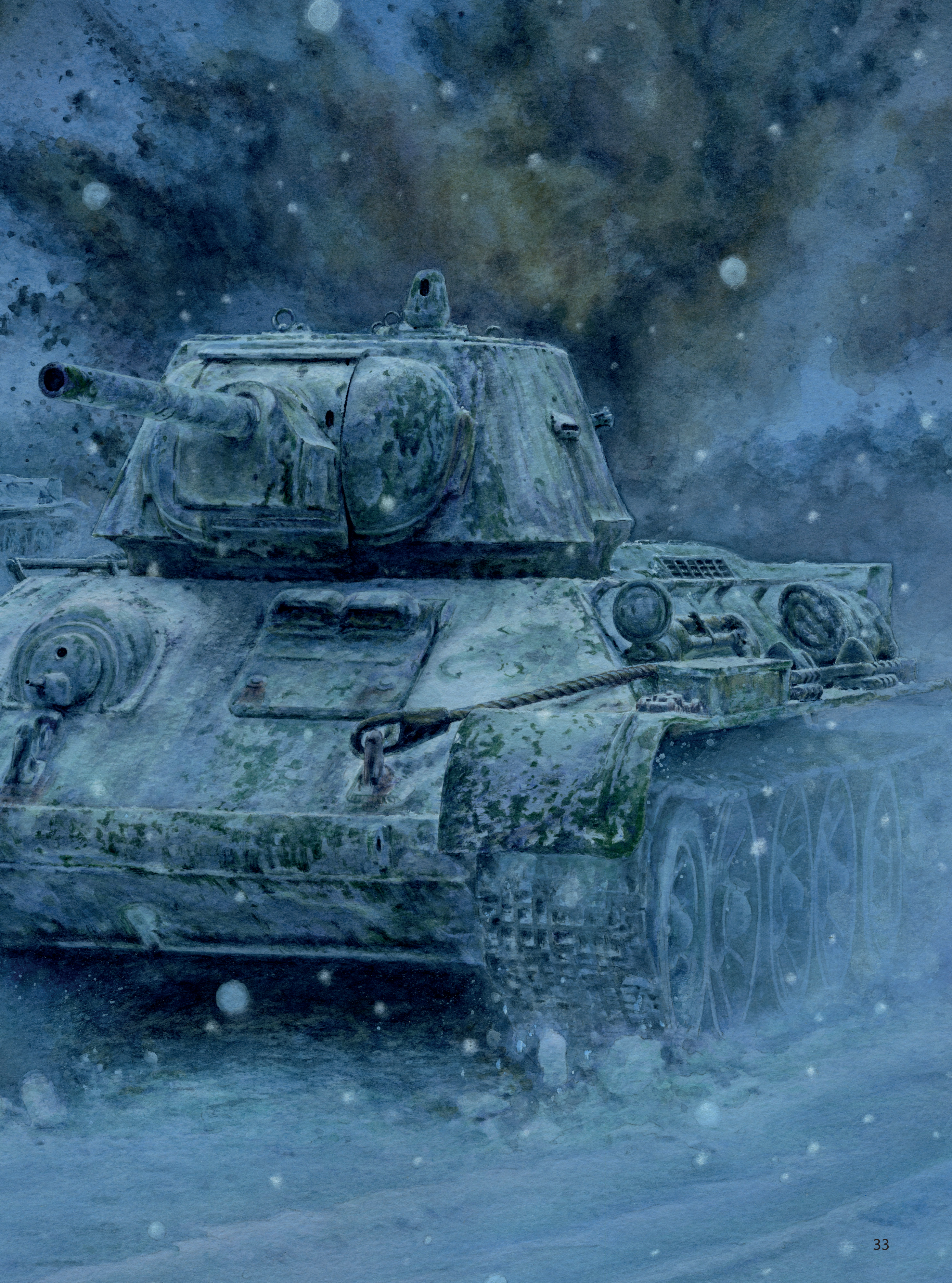

A T-34 in a winter defensive position. During von Manstein's December *Winter Storm* attempt to relieve the encircled Sixth Army, his 57th Panzer Korps made good initial progress, but was ultimately halted when Stalin allowed mechanized units earmarked for the *Saturn* offensive to be pulled out and sent to halt the attack. Hitler refused to allow Paulus to attack out of the Stalingrad pocket, and with the 57th's attack halted, the Sixth Army's fate was sealed. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

The Red Army massed almost 1,400 tanks for the offensive, including 198 KV heavy and 660 medium T-34 tanks. The tank brigades were typically about half T-34s and half T-60s or T-70s, while most of the KV-1 heavy tanks were organized in separate heavy tank brigades or breakthrough tank regiments. For *Uranus*, the cavalry corps had tanks assigned to increase their firepower, including some KV-8 flamethrower tanks. The newly formed 4th Mechanized Corps was particularly well equipped, with over 200 tanks and 6,000 infantrymen in its nine motorized rifle and five tank battalion-sized units, although at this stage of the war it lacked artillery or adequate support units.

Vatutin's forces would be striking the Romanian Third Army, whose divisions were spread thin trying to defend wide sectors, often holding a front of up to 20km, with inadequate artillery and weak antitank capabilities. Romanian divisions only had 12 47mm antitank guns at division level, and each regiment had 12 37mm guns. The 48th Panzer Korps was the only reserve available, with the 22nd Panzer and Romanian 1st Armored Division. The 22nd lacked one of its grenadier regiments and its pioneer battalion, and only had 40 operational tanks, including 22 PzKpfw IIIs and 11 IVs. The Romanian 1st Armored Division had 87 R-2s, Romanian-operated versions of the Czech-designed Panzer 35(t), in addition to 11 PzKpfw IIIs and 11 IVs, along with nine 5.0cm Pak 38 and nine 7.5cm Pak 40 antitank guns.

Operation *Uranus* began with Vatutin's and Rokossovsky's artillery barrages during the early morning hours of November 19 in a heavy snowstorm that forced the cancellation of the planned supporting Soviet airstrikes. Despite desperate fighting by many of the Romanian infantry

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M3S MEDIUM TANK AND M3L LIGHT TANK

1. M3S Medium Tank, 241st Tank Brigade, September 1942. An M3S lend-lease medium tank in 1942. Although the Soviets received Lee variants of the M3 medium tank, with a cupola-mounted small machine-gun turret and seven-man crew, the Red Army called them Grants. The M3S was unpopular with Soviet crews due to its height, thin armor, and gasoline engine, and was dubbed "a coffin for seven brothers." The top illustration shows an M3S from the 241st Tank Brigade, which conducted one of the many unsuccessful attacks against Paulus' Sixth Army's northern flank as it attacked into Stalingrad. It retains the original US olive drab paint as well as an often-seen patriotic slogan, "*for Stalin*." Despite having had little time to familiarize themselves with their 23 M3 Lees and 25 M3 Stuarts, the brigade was sent to attack the German 3rd Motorized Division. The 241st carried infantry on the tank decks and encountered heavy enemy fire. Only three of the brigade's tanks were operational next day.

2. M3L Light Tank. A Stuart M3L light tank in Soviet service in 1942. This model is one of the early riveted variants and retains the two .30-cal. machine guns originally positioned to fire straight ahead in the hull. The Soviets derided the two hull machine guns, which were soon removed from their M3Ls. British and US tank units in action in 1942 shared this view and similarly removed the hull machine guns from their Stuarts. Although criticized by the Red Army, the M3 with its four-man crew and radio was clearly superior to the T-60 and T-70 two-man tanks that the Soviets had to employ in large numbers.

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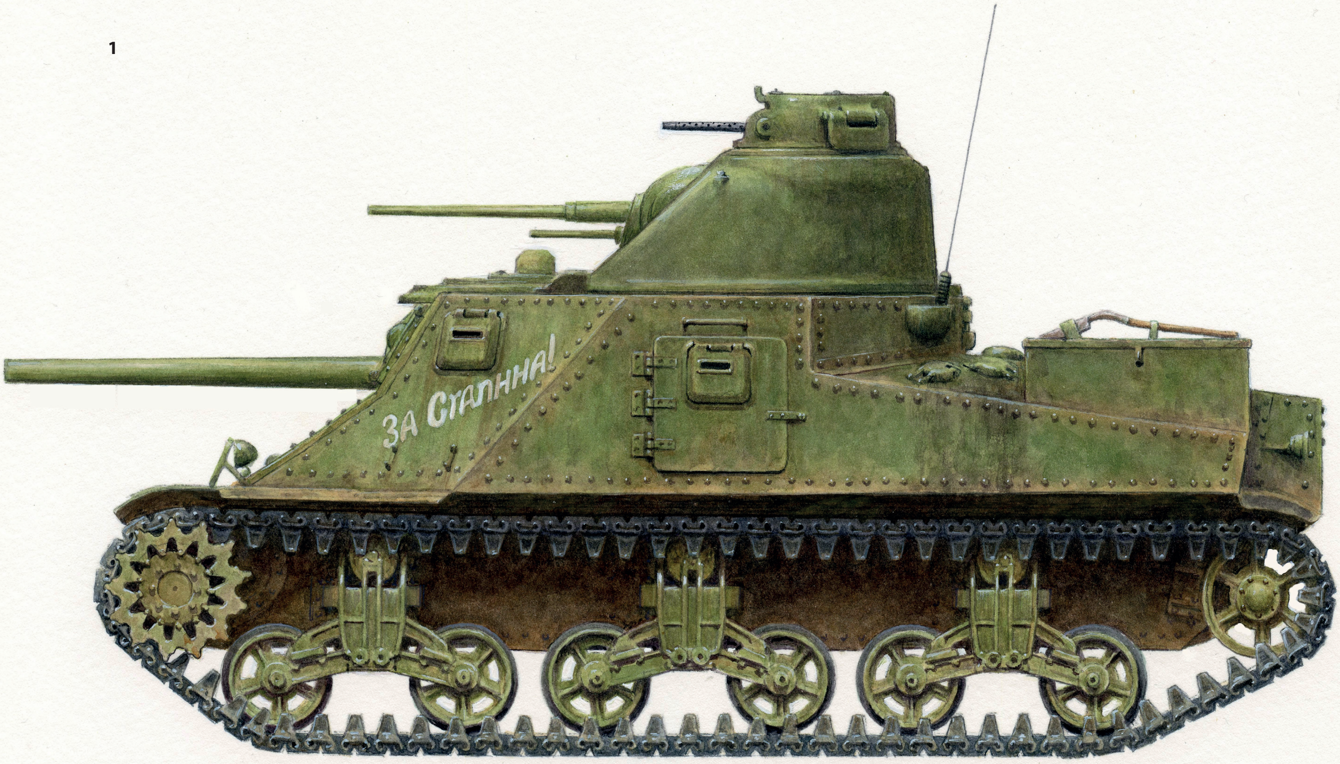

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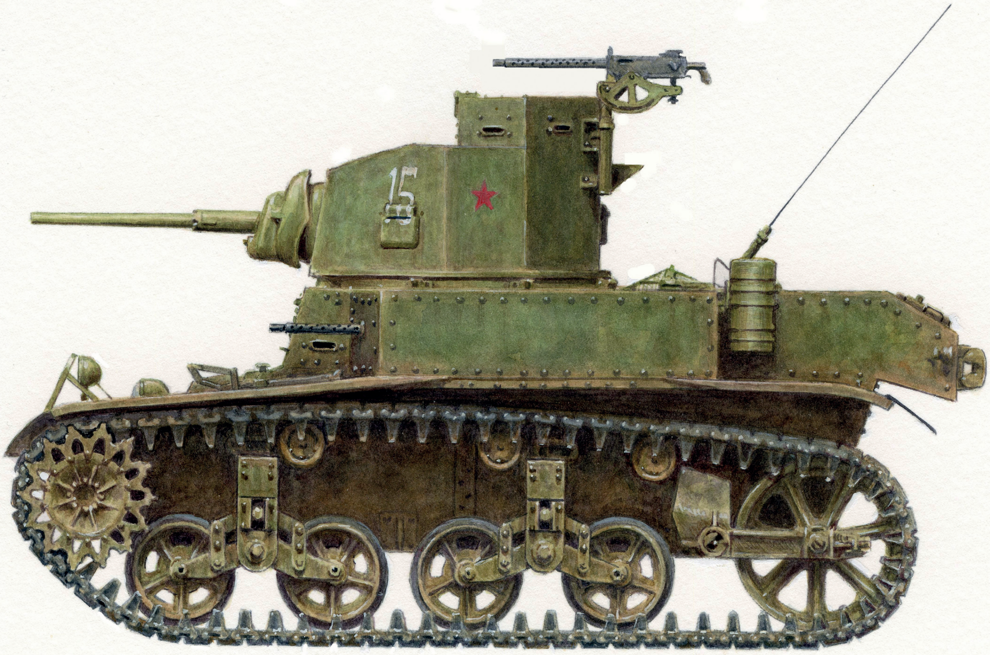
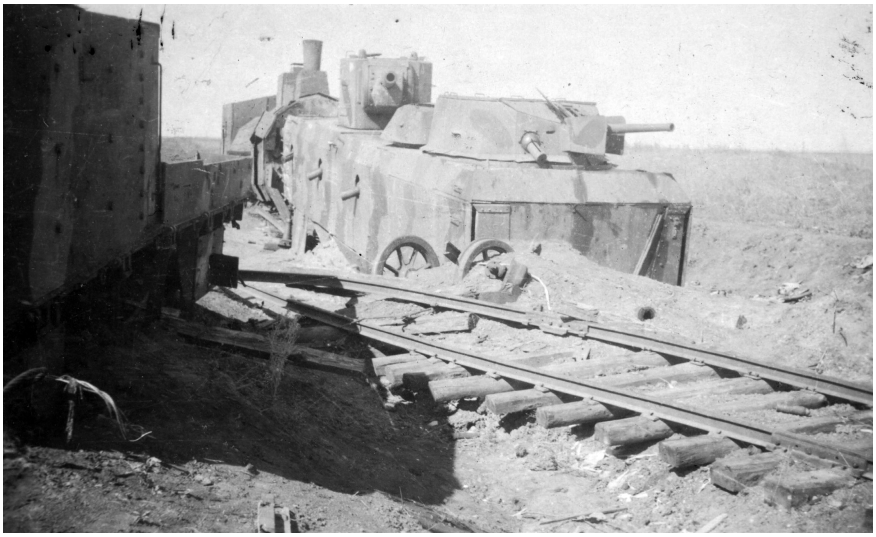


A Red Army T-34 formation advancing during the night. During Operation *Uranus*, the exploiting 26th Tank and 4th Mechanized Corps drove through the hours of darkness after breaking through Romanian lines north and south of Stalingrad and were soon able to link up and encircle the German Sixth Army. (Photo by Slava Katamidze Collection/ Getty Images)

divisions, the Soviets achieved a series of breakthroughs by the 20th, trapping 40,000 of the defenders in a small pocket while the tank and cavalry corps began to exploit to the south. The 48th Panzer Korps moved north to meet the attack, and the Romanian 1st Armored Division attempted to relieve the encircled infantry but itself became trapped and had to conduct its own costly breakout. The 22nd Panzer Division met and engaged the 5th Tank Army's 1st Tank Corps, holding it up for a day near Peschanyi, but the 26th and 4th Tank Corps bypassed the fighting and drove rapidly to the south against little opposition. Yeremenko began his portion of the *Uranus* plan on the 20th, and his Stalingrad Front's 4th Mechanized Corps' tanks rapidly broke through the Romanian Fourth Army's thin defensive line. The 5th Tank Army's 26th Tank Corps captured the key bridge over the Don at Kalach from scattered German supply and maintenance units on the 22nd and linked up with the 4th Mechanized Corps advancing from the south, sealing in Paulus' Sixth Army. Three Panzer and three motorized divisions with 12 of the Wehrmacht's 46 Panzer battalions on the Eastern Front were trapped in the pocket.

While the Soviets strengthened the ring around the Stalingrad pocket during the next few weeks, the Luftwaffe attempted to supply the Sixth Army by air. Hindered by poor flying conditions and the Red Air Force's air blockade, the Germans failed to meet even the minimal supply needs of the nearly 300,000 trapped troops, but Hitler had ordered a relief force assembled under Field Marshal Erich von Manstein to punch through to the Stalingrad pocket. At the same time, the Soviet high command was planning its own next offensive, designated Operation *Saturn*, aiming to break through the Italian Eighth Army's defenses on the Don River and drive on Rostov and the Sea of Azov. If successful, the attack would cut off Army Group A,



A destroyed armored train. The Red Army was unable to use armored trains to lead assaults as it had during the Russian Civil War, due to their vulnerability to direct tank and artillery fire, and they were usually held behind the front and used for indirect fire support or antiaircraft defense. Air attack also posed a major threat, and the Luftwaffe developed specialized aircraft and units to sweep the Soviet rail net on train-hunting missions. (Nik Cornish at www.Stavka.photos) which had been stalemated in the Caucasus since the autumn. The German relief attack, Operation *Winter Storm*, began first, on December 12. The 57th Panzer Korps' 6th and 23rd Panzer Divisions, soon reinforced by the 17th, initially made good progress towards Stalingrad. The attack forced the Soviets to pull forces designated for the *Saturn* offensive to block the German advance, and these reinforcements, including the 5th Mechanized Corps' Valentines and Matildas, ultimately halted von Manstein's attack 4km from the pocket. Hitler would not allow the encircled Sixth Army to attack out of the pocket to try and meet the relief force, sealing its fate. The ambitious *Saturn* plan was in the meantime revised into a more limited operation designated *Little Saturn*.

Operation *Little Saturn*

Like *Uranus*, Operation *Little Saturn* would achieve a breakthrough by attacking one of the weaker Axis allied armies, the Eighth Italian. The Italians had very little armored support, with a single battalion of 58 L6/40 tanks equipped with 20mm guns, and a cavalry regiment with 19 Semovente 47/32 self-propelled guns. The infantry had 47mm antitank guns effective against Soviet light tanks but not against the T-34. The only effective reserve force was the 27th Panzer Division, but it only had one Panzer and two Panzer grenadier battalions at the time of the Soviet attack. The 27th's single Panzer battalion had seven different types of tanks, with only the ten long-barreled PzKpfw IIIs and five long-barreled PzKpfw IVs having a capability against Soviet T-34s and KV-1s. For *Little Saturn*, the 1st Guards Army would be the primary breakthrough force, with nine rifle divisions and the 17th, 18th, 24th, and 25th Tank Corps. The 3rd Guards and 5th Tank Armies on the 1st Guard's left flank would launch supporting attacks. The 24th and 25th were tasked for deep exploitation against the airfields used by the Luftwaffe to resupply Stalingrad. *Little Saturn* began with an artillery barrage at 0800hrs on December 16, and while the Italian infantry put up a staunch defense, the next day the 1st Guards Army's 17th Tank Corps was sent forward and breached the enemy lines.

The 24th and 25th Tank Corps were then sent on a deep exploitation operation aimed at the German airfields at Tatsinskaya and Morozovskaya, both key staging bases for the Luftwaffe's effort to keep the Sixth Army supplied. The Red Army tanks made good initial progress but lacked adequate supplies, and their advance fell behind schedule in the deep snow. Soviet command and control limitations hindered the exploitation, and the corps were unable to communicate with the Soviet Air Force to request aerial resupply. The 25th Tank Corps was ultimately blocked by the German 306th Infantry Division and ran out of fuel before it could reach Morozovskaya. The 24th, however, was able to dash to Tatsinskaya with two tank brigades and launched a dawn attack on December 24. Panicked German pilots

Soviet T-34s on the advance carrying their submachinegun-armed tank riders. Employing the same formula as *Uranus*, for Operation *Little Saturn* the Red Army selected an under-equipped Axis allied army, the Eighth Italian, as its initial target and, after breaking through the defenses, unleashed the 24th and 25th Tank Corps to raid Luftwaffe airfields over 200km behind the front. (Courtesy of the Central Army Museum Moscow via Stavka.)

A German patrol takes cover behind a disabled T-34 during the fighting for Stalingrad, October 1942. Due to security concerns, Soviet tanks did not carry standardized markings, but local commanders could institute tactical marking systems for specific operations, often using triangle symbols as seen here. (Heinrich Hoffmann/ Mondadori via Getty Images)

flew many Ju 52 transports off under fire, dodging burning aircraft wrecks on the runway, but 46 aircraft were lost to the T-34s. The counterattacking 6th and 11th Panzer Divisions subsequently encircled the 24th Tank Corps at the airfield, forcing the Soviets to abandon their remaining vehicles and retreat three days later.

Little Saturn had advanced the front to the west and crippled the Luftwaffe's supply airlift to the Stalingrad pocket, but Rostov remained in German hands at the end of the year. Early 1943 saw the final destruction of the Sixth Army in the Stalingrad pocket, the retreat of German forces into eastern Ukraine, Soviet offensives to retake Kursk and Kharkov, and von Manstein's "backhand blow" counteroffensive that cut off and destroyed the Red Army spearheads and retook Kharkov. The spring muddy season brought operations to a halt, with Hitler planning to cripple the Red Army's offensive capabilities and regain the initiative in the summer of 1943 by hurling his rebuilt Panzer force against the Soviet salient around Kursk.

Operation *Mars*

While *Fall Blau* and *Uranus* played out in the south, the Red Army launched a series of lesser-known offensives against the Wehrmacht's Army Group Center. During the summer, before realizing that *Fall Blau* was Hitler's main effort, Marshal Georgy Zhukov determined to make use of the six tank corps retained to protect Moscow. Zhukov chose Army Group Center's 2nd Panzer Army – which, despite its title, consisted of infantry divisions at the time rather than Panzers – as his target. Like the initial tank offensives in the south, the Soviet July attacks against the 2nd Panzer were poorly coordinated, and the 3rd and 10th Tank Corps were soon rendered combat ineffective. Army Group Center followed with its own offensive, Operation *Wirbelwind* (Whirlwind), in August, but made little progress in the heavily wooded terrain. A renewed attack by the 3rd Tank Army followed but was frustrated by staff inexperience and logistical problems. The Luftwaffe repeatedly struck the stalled Soviet columns, and by September the 3rd Tank

Soviet T-34s and infantry of the Western Front on the attack. Along with Operation *Uranus*, Stavka launched a simultaneous attack against Army Group Center, Operation *Mars*. In contrast to the south, *Mars* failed to achieve surprise and was launched against well-entrenched German infantry backed by Panzer reserves, resulting in a costly repulse. (Sovfoto/Universal Images Group via Getty Images)

Army was effectively destroyed. The attacks were costly, with Zhukov using five of the 22 tank corps that had been formed at that point and losing at least 1,000 tanks. The action did, however, lead Hitler to retain six of the 19 Panzer divisions in the east along with scarce Luftwaffe assets to support Army Group Center against the sustained Soviet attack.

Operation *Uranus* was the decisive Soviet offensive of 1942, but Stavka planned a lesser-known parallel November attack against Army Group Center, Operation *Mars*. *Mars* was led by Zhukov and employed more tanks than Operation *Uranus* to the south, with 2,352 tanks allocated to *Mars* and just under 1,400 to *Uranus*. Zhukov planned to attack from the west and east, cutting off Walter Model's Ninth Army, which had held the Rzhev salient since the Operation *Typhoon* offensive against Moscow had ground to a halt in December 1941. Unlike *Uranus*, the Red Army's attempts at *Maskirovka* (a military strategy based on misdirection and deception) for the *Mars* offensive were unsuccessful, and the defenders were able to identify the main axes of attack and strengthen their defenses in the targeted sectors.

Distribution of the Soviet tank force, November 19, 1942*

Fronts	**Tanks**
Karelia and 7th Army	220
Leningrad, Volkhov, Northwestern	1,089
Kalinin, Western Fronts, Moscow Defense Zone	3,375
Bryansk, Voronezh	884
Southwestern, Don, Stalingrad	1,394
Transcaucasus Front	319
Far Eastern Theater	2,526
Total*	9,806

*Does not include training establishment tanks, or those in interior military districts or Stavka Reserve

The Red Army began *Mars* with a massive barrage on November 25, but the Wehrmacht's own artillery peeled away the waves of attacking Soviet infantry, and antitank guns then picked off the isolated and vulnerable T-34s and KV-1s as they struggled in the German minefields. Zhukov demanded

A T-34 driving at high speed through the Square of Fallen Fighters in Stalingrad, January 1943, during the final push against the remnants of Paulus' Sixth Army. Although Soviet tanks did not carry standardized markings, the Red Army encouraged patriotic slogans, and this T-34 is named "*Rodina*" ("motherland"). (Sovfoto/ Universal Images Group via Getty Images)

more attacks, and more and more infantry and tank reinforcements were fed into poorly coordinated assaults. Any threatened breakthrough was rapidly checked by the six Panzer divisions retained as reserves. Within four weeks, the 1st and 3rd Mechanized and the 5th and 6th Tank Corps, along with numerous separate tank regiments and brigades, had lost 1,852 tanks, and the attacking force suffered 335,000 casualties. Only in February 1943, on Model's recommendation, did Hitler approve a voluntary withdrawal from the salient.

Tigers at the front

Late 1942 brought another indication of challenges the Soviet tank force would face the next year. Germany had been working on the PzKpfw VI Tiger to serve as a breakthrough tank and deployed small numbers of the heavily armored tank in 1942. The Tiger was expensive to produce, heavy,

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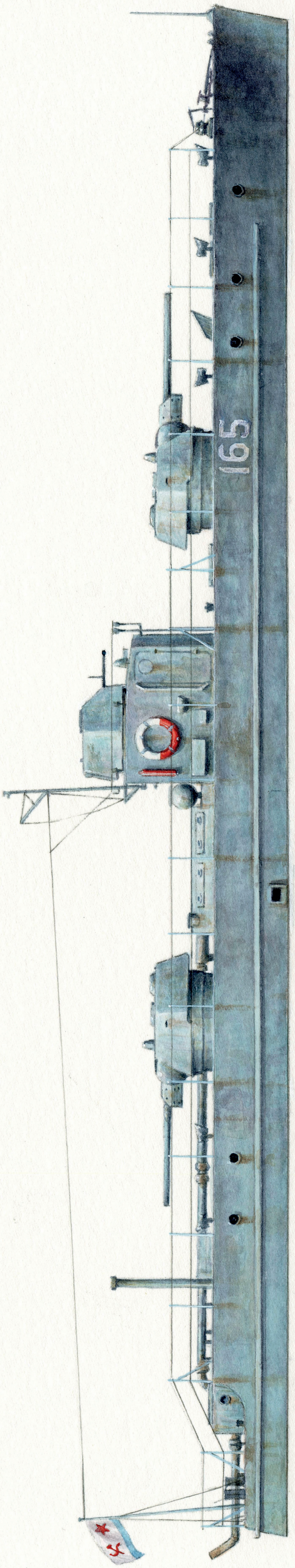
ARMORED RIVER GUNBOAT AND RAIL GUN PLATFORM

1. Soviet Project 1124 Armored River Gunboat. The Soviets used tank turrets to provide armored firepower for their riverine BKA gunboats including the 99 Project 1124s built during the 1930s and war years. The 1124 had an antiaircraft machine-gun turret atop its armored conning tower, and those produced in the 1930s had T-28 tank turrets mounted fore-and-aft. The T-28 turrets were heavy, and the gun could not be elevated for effective long-range fire. During the war, more effective T-34 turrets with F-34 76.2mm main guns were used. Use of the tank turrets protected the gun crews and eased maintenance as the turrets shared parts with the ground force's tank force. Some 1124s were modified to carry Katyusha multiple rocket launchers which usually replaced the aft T-34 turret. In 1942, the similar Project 1125 BKAs were sent to the Volga Flotilla, the critical lifeline for the 62nd Army defending Stalingrad, with the 1124s produced at Astrakhan used for the Caspian Sea Flotilla, where it was expected Axis naval forces would soon be active.

2. PL-12 Armored Rail Gun Platform. Although vulnerable to air attack and direct fire from enemy guns and tanks, all combatants on the Eastern Front made extensive use of armored trains. The USSR built a number of trains to replace its initial 1941 losses and expand the force, and by the end of 1942 stabilized with 61 armored train battalions, each with two or more trains. In the spring of 1942, the Soviets developed a standardized BP-43 train with an armored locomotive, two PVO-4 wagons with 37mm antiaircraft guns, and four PL-43 artillery cars each with one T-34/76 turret. The illustration shows a less common PL-12 rail gun platform with two T-34 turrets. The turrets, like those on the Project 1124 and 1125 armored gunboats, were standard tank turrets with F-34 76.2mm main guns, simplifying production, maintenance, and training.



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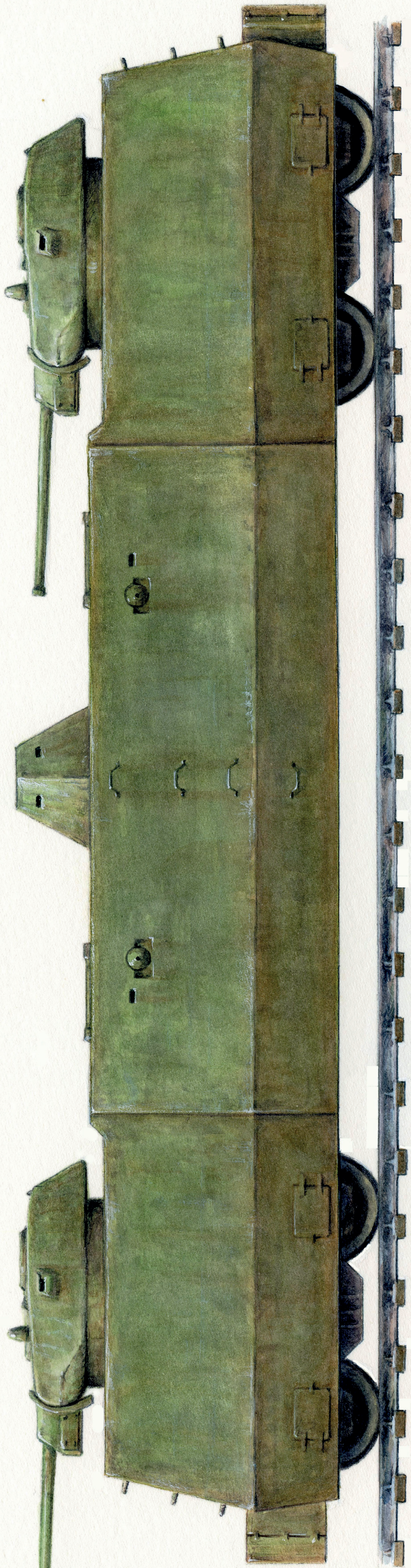

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A German Panzer VI Tiger tank. 1942 saw the introduction of small numbers of the new heavy tank, along with increasing numbers of Panzer IVs with long 7.5cm guns able to penetrate the T-34's front armor. The improved German capabilities led the Soviets to begin to investigate ways to improve the T-34, leading to the fielding of the T-34/85 in early 1944. (Nik Cornish at www.Stavka.photos)

and difficult to maneuver and maintain, but its 8.8cm KwK 36 L/56 gun gave it an exceptional long-range ability to defeat allied tanks, including the T-34 and KV-1. Only a small number were completed in 1942, but the Germans sent the three available Tiger companies into combat, with one going to Tunisia, one to the Leningrad Front, and one to reinforce Army Group South. Two Tigers were captured and retrieved after an ill-considered counterattack in swampy terrain near Leningrad in September 1942, giving Soviet specialists the ability to thoroughly evaluate the new threat. The Tiger company sent to the south did not arrive in time to support the December *Winter Storm* counterattack to relieve Stalingrad.

BATTLE ANALYSIS

In the winter of 1942, the Red Army's tank forces were able to achieve its first major victories by smashing the forces of Hitler's Romanian and Italian allies and encircling and destroying Paulus' Sixth Army. The successes of November and December followed ten months of costly reverses. Of the 11 major offensives launched by the Soviets during 1942 that used multiple tank corps, the first nine were costly defeats. Much of the fault lay with Stalin, who during the summer and autumn repeatedly ordered immediate attacks by hastily assembled armored formations that left no time for preparation, planning, or even basic reconnaissance. Zhukov also sent units into repeated, costly attacks, attempting to turn defeats into successes through brute force.

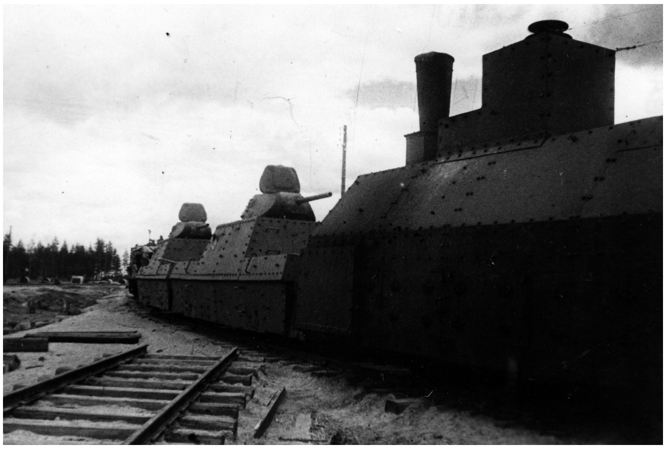
With Operation *Uranus*, the Red Army was finally able to adequately prepare and plan for an offensive. The Soviets made extensive use of *Maskirovka* deception techniques to hide their preparations and objectives. The offensive deftly targeted the thinly stretched and less well-armed Romanian forces rather than attack German units head-on, resulting in the encirclement and ultimate destruction of the Sixth Army. *Little Saturn* was similarly launched against another weaker Axis allied force, the Italian Eighth Army. In both operations, once enemy lines were penetrated, the Red Army's tank, mechanized, and cavalry corps were able to conduct deep exploitation operations for the first time. Soviet forces repeated the pattern in January 1943, destroying the Second Hungarian Army and following with exploitation operations towards Kursk and Kharkov.

While the Soviet tank forces demonstrated their ability to break through the weaker fronts held by the Axis allies and exploit into the enemy rear, their

German Panzer IIIs ready to engage one of the Red Army tank counterattacks repeatedly launched against Army Group B's northern flank. The smoke in the distance marks burning Soviet tanks. Red Army armor often attacked over unfavorable open terrain, as seen here, and took heavy losses to German fire and Luftwaffe ground attack aircraft. (Photo by Imperial War Museums via Getty Images)

forces still had major limitations that kept operations in late 1942 and early 1943 from achieving complete success. Red Army tank formations remained poorly trained in combined arms operations, and the tank corps structure in late 1942 still lacked artillery as well as adequate engineer, reconnaissance, and maintenance support units. The tank armies had mixes of tank corps, brigades, and sometimes rifle divisions and cavalry corps, making command and control difficult, and lacked adequate army-level artillery or support units. Tank corps and army commanders were only beginning to gain the experience needed to capably wage armored maneuver warfare. As a result, the 24th and 25th Tank Corps had only a partial success during *Little Saturn*, with the 25th prevented from reaching its objective and the 24th surrounded by counterattacking German Panzer divisions and having to abandon its tanks to break out. Similarly, in early 1943 von Manstein's counteroffensive cut off and destroyed the leading Soviet armored formations, recaptured Kharkov, and brought the Red Army's westwards drive to a halt.

The lack of training and expertise at the tactical level ensured that the Red Army suffered much heavier tank losses than their opponents throughout the year. The Soviets lost over 15,000 tanks during 1942, including 6,600 T-34s, 7,200 T-60 and T-70s, and 1,200 KV-1s, along with about half of the 3,500 lend-lease tanks received from the Western allies. In turn, Germany lost 2,480 tanks on the Eastern Front during 1942, resulting in a 7:1 exchange rate with the Red Army, along with another 563 lost in North Africa. In 1942, Soviet industry produced 24,231 tanks, including 12,535 T-34s and 2,426 KV-1s, allowing the order of battle to have 18,000 tanks on hand at the beginning of 1943, although some were in the Far East, in training schools, or in other interior military districts. Due to the heavy T-34 losses, there were still more light tanks – 8,500 – than T-34s on the front line at the end of the year.



The Red Army also used tank turrets to increase the firepower of its armored train battalions. Poor roads in the USSR made its rail net an effective means to rapidly shift firepower to where it was needed, and the Soviets often assigned each front two or more armored train battalions. Each consisted of two to three armored trains, making it the equivalent of an artillery battalion. The railcars carried KV-1 or T-34 tank turrets mounted atop each armored car. In addition to fire support, antiaircraft armored trains were often positioned to defend key rail junctions and bridges against Luftwaffe attack. Air defense armored trains were equipped with mixes of 12.7mm heavy machine guns and 25 and 37mm light antiaircraft guns. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

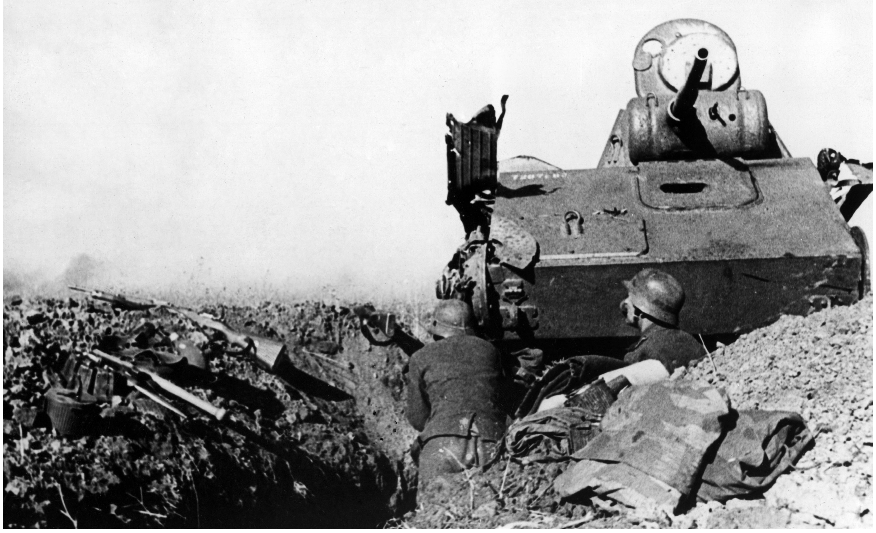
Destroyed T-34s. Despite its technical superiority over its German opponents, the Red Army lost around 6,000 T-34s during 1942. Superior German crew training and tactics led to a 7:1 exchange rate of German to Soviet tanks lost during the year. (Nik Cornish at www.Stavka.photos)

A damaged tank chassis outside of the Stalingrad Tractor Factory (STZ). The STZ facility produced T-34s until German units began to storm the factory in late 1942. In turn, encircled German infantry formed some of their final pockets of resistance in the factory ruins before surrendering in early 1943. (Nik Cornish at www.Stavka.photos)

Spurred by the lessons of 1942, the Red Army strove to improve its armored force. The tank and mechanized corps received new or expanded engineer, reconnaissance, supply, maintenance, and fire support units. More of the powerful mechanized corps were organized, and the eight formed in 1942 would ultimately be joined by six additional ones, along with one that served throughout the war in the Far East. The ad hoc tank armies of 1942 were replaced with a new, specialized tank army organization. Rather than a difficult-to-control mix of tank, infantry, and cavalry formations, the 1943–45 tank armies would consist solely of tank or mechanized corps to allow rapid maneuver and exploitation operations. Proven, battle-tested armor leaders became available to lead the tank corps and armies.

1943 also brought efforts to improve the Soviet tank fleet. The T-34 would remain the Red Army's primary tank throughout the war, but the emergence of the Tiger, along with increasing numbers of the Panzer IV and StuG assault gun with long 7.5cm guns, led to efforts to improve the T-34 in 1943. As a result, the Red Army would begin to receive the T-34/85 in early 1944, with a three-man turret crew and an 85mm main gun better able to cope with the improving German tank fleet. As it offered no advantages over the less expensive T-34, KV tank production was halted in 1943 in favor of the T-34/85. Later in 1944, the IS-2 heavy tank would better fill the role of providing heavy firepower to the Soviet armored force.

In 1943, lend-lease tanks were increasingly removed from the tank and mechanized corps and relegated to separate infantry support tank brigades



German troops using a disabled T-70 for cover during the fighting for Stalingrad in October 1942. The front view highlights how the T-70's turret was offset to the left side of the tank, with the driver sitting directly in front of the gunner/loader/commander in the turret. The two GAZ engines were in tandem on the right of the tank. (Heinrich Hoffmann/Mondadori via Getty Images) and regiments. During the year, shipments of Stuarts, Lees, and Matildas came to an end, and the Red Army requested the tank supply from the west consist primarily of M4 Sherman tanks, which ultimately equipped several tank and mechanized brigades and even full corps later in the war, and 6-pdr-equipped Valentines, which the Soviets used in the light tank role.

Impressed by the German use of the StuG assault gun, the Soviets began to pursue the fielding of their own self-propelled guns. The SU-76 and SU-76M made use of the T-70 chassis, placing a much more powerful divisional 76.2mm gun at the front to support Soviet armored and infantry formations, and making good use of T-70 production facilities after the light tank was discontinued. In late 1942, the first SU-122s joined the force, mounting an M-30 howitzer on a modified T-34 chassis. As a stopgap measure, several hundred SU-76is were also fielded in 1943, with a 76.2mm gun mounted on heavily modified Panzer III chassis captured with the Sixth Army at Stalingrad. By 1943, the powerful SU-152 with a 152mm howitzer mounted on a KV-1 chassis also began to join the force.

By the summer of 1943, the Panzer force in the east had been rebuilt with improved PzKpfw IVs and battalions of Tigers joining the PzKpfw IIIs, but Hitler realized that an offensive on the scale of *Fall Blau* was impossible. To strike at Soviet offensive capabilities and secure the initiative, he chose to launch a limited offensive to cut off Soviet forces massed to defend the Kursk salient. The German offensive began in July and was able to slowly grind through the Red Army's multiple defensive lines, but would ultimately be halted by its tank corps and armies – a force rebuilt, rearmed, and reorganized based on the hard lessons of 1942.

Soviet tank officers giving a tactical orientation briefing. Soviet armored operations at the tactical and operational levels were often crippled by the hasty training of tank crews and the inexperience of leaders and staffs. Stalin and Zhukov often worsened the situation in 1942 by repeatedly demanding rapid counterattacks against German forces, allowing the tank corps and armies little time for adequate reconnaissance and planning. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

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Title page caption

A T-34-equipped unit on the move, winter 1942. After suffering heavy losses during the summer and autumn, Soviet tank corps and armies were able to launch a series of combined-arms offensives during the winter months that encircled the German Sixth Army at Stalingrad and drove Axis forces from the Caucasus. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

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